Linux Foundation Certified Kubernetes Application Developer Exam Online Questions - Outstanding Practice To your CKAD Exam

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- It will help employers assess how qualified candidates are for their job requirements.
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>> CKAD Test Answers <<

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Linux Foundation Certified Kubernetes Application Developer Exam Sample Questions (Q72-Q77):

NEW QUESTION # 72
You're building a Kubernetes application that manages user profiles and requires a custom resource for storing profile information. Design a custom resource definition (CRD) and its corresponding controller, ensuring that every time a profile is created or updated, a unique user ID is assigned to the profile.

Answer:

Explanation:
See the solution below with Step by Step Explanation.
Explanation:
Solution (Step by Step) :
1. Create the Custom Resource Definition (CRD)I
- Define the CRD Spec:

```
apiVersion: apiextensions.k8s.io/v1
kind: CustomResourceDefinition
metadata:
  name: profiles.example.com
spec:
  group: example.com
  versions:
  - name: v1
    served: true
    storage: true
    schema:
      openAPIV3Schema:
        type: object
        properties:
          metadata:
            type: object
          spec:
            type: object
            properties:
              name:
                type: string
                description: User name
              email:
                type: string
                description: User email
              userId:
                type: string
                description: Unique user ID
  scope: Namespaced
```


- Apply the CRD: bash kubectl apply -f profile-crd_yaml 2. Create a Controller for the Custom Resource: - Define the Controller Logic:

```
go
```

```
package main

import (
"context"
"fmt"
"time"

metav1 "k8s.io/apimachinery/pkg/apis/meta/v1"
"k8s.io/apimachinery/pkg/runtime"
"k8s.io/apimachinery/pkg/types"
"k8s.io/client-go/kubernetes/scheme"
ctrl "sigs.k8s.io/controller-runtime"
"sigs.k8s.io/controller-runtime/pkg/client"
"sigs.k8s.io/controller-runtime/pkg/log"

examplev1 "github.com/your-org/example-operator/api/v1"
)
// ProfileReconciler reconciles a Profile object
type ProfileReconciler struct {
client.Client
Scheme runtime.Scheme
}

//+kubebuilder:rbac:groups=example.com,resources=profiles,verbs=get;list;watch;create;update;patch;delete
//+kubebuilder:rbac:groups=example.com,resources=profiles/status,verbs=get;update;patch
//+kubebuilder:rbac:groups=example.com,resources=profiles/finalizers,verbs=update

func (r ProfileReconciler) Reconcile(ctx context.Context, req ctrl.Request) (ctrl.Result, error) {
_ = log.FromContext(ctx)

// Fetch the Profile instance
profile := &examplev1.Profile{}
err := r.Get(ctx, req.NamespacedName, profile)
if err != nil {
return ctrl.Result{}, client.IgnoreNotFound(err)
}

// Generate a unique user ID (replace with your logic)
userId := generateUniqueUserID(profile)
// Update the Profile with the user ID
profile.Spec.UserID = userId

// Update the Profile resource
err = r.Update(ctx, profile)
if err != nil {
return ctrl.Result{}, err
}

return ctrl.Result{RequeueAfter: time.Second 5}, nil
}

// Generate a unique user ID (replace with your logic)
func generateUniqueUserID(profile examplev1.Profile) string {
// You can use a combination of namespace, name, and a random ID
return fmt.Sprintf("%s-%s-%d", profile.Namespace, profile.Name, 12345)
}

func main() {
// Register the scheme for the custom resource
scheme.AddToScheme(scheme.Scheme)
examplev1.AddToScheme(scheme.Scheme)
// Create a new controller manager
mgr, err := ctrl.NewManager(ctrl.GetConfigOrDie(), ctrl.Options{Scheme: scheme.Scheme})
if err != nil {
setupLog.Fatal(err, "unable to start manager")
}

// Register the ProfileReconciler
if err := (&ProfileReconciler{
Client: mgr.GetClient(),
Scheme: mgr.GetScheme(),
}).SetupWithManager(mgr); err != nil {
setupLog.Fatal(err, "unable to create controller", "controller", "Profile")
}

// Start the controller
if err := mgr.Start(ctrl.SetupSignalHandler()); err != nil {
setupLog.Fatal(err, "problem running manager")
}
}
```

- Define the Profile Resource:

```
go
package v1
import (
metav1 "k8s.io/apimachinery/pkg/apis/meta/v1"
)
```

```
// ProfileSpec defines the desired state of Profile
type ProfileSpec struct {
// Name of the profile
Name string `json:"name"`
// Email address
Email string `json:"email"`
// Unique user ID
UserID string `json:"userId"`
}

// ProfileStatus defines the observed state of Profile
type ProfileStatus struct {
// Insert your status fields here
}

//+kubebuilder:object:root=true
//+kubebuilder:subresource:status
//+kubebuilder:resource:path=profiles,scope=Namespaced
type Profile struct {
metav1.TypeMeta `json:",inline"`
metav1.ObjectMeta `json:"metadata,omitempty"`

Spec ProfileSpec `json:"spec,omitempty"`
Status ProfileStatus `json:"status,omitempty"`
}

//+kubebuilder:object:root=true
type ProfileList struct {
metav1.TypeMeta `json:",inline"`
metav1.ListMeta `json:"metadata,omitempty"`
Items []Profile `json:"items"`
}

func init() {
SchemeBuilder.Register(&Profile{}, &ProfileList{})
}
```

3. Build and Deploy the Controller:

- Build the controller binary:
bash
go build
- Deploy the controller to your Kubernetes cluster:
- You can use `kubectl apply -f deployment.yaml` to deploy the controller as a Deployment, making sure to include the necessary resources in the YAML file.

4. Create a Profile Resource:
- Create a profile YAML:

```
apiVersion: example.com/v1
kind: Profile
metadata:
  name: my-profile
spec:
  name: John Doe
  email: john.doe@example.com
```

- Apply the YAML:
bash
kubectl apply -f profile.yaml

5. Verify the User ID Generation:
- Get the profile resource:
bash
kubectl get profile my-profile -o yaml

- Check the 'userId' field in the output You should see the automatically generated unique user ID. This comprehensive solution demonstrates how to implement a custom resource definition and a controller for managing user profiles in Kubernetes. You can adjust the code and logic according to your specific requirements. ,

NEW QUESTION # 73
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
- 'runAsLJser': Specifies the user ID under which the container should run.
- 'runAsGroup': Defines the group ID for the container.
- 'tsGroup': 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.

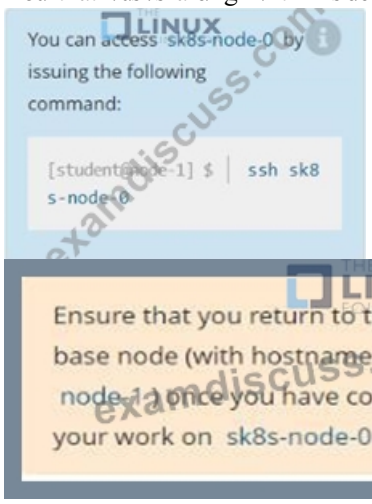
```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: api-deployment
spec:
  replicas: 3
  selector:
    matchLabels:
      app: api-server
  template:
    metadata:
      labels:
        app: api-server
    spec:
      containers:
      - name: api-server
        image: example/api-server:latest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


2. Apply the Deployment: - Use 'kubectl apply -f api-deployment_yamr to update the Deployment with the security context configuration. 3. Verify the Security Context: - Examine the pod details using 'kubectl describe pod -I 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 # 74

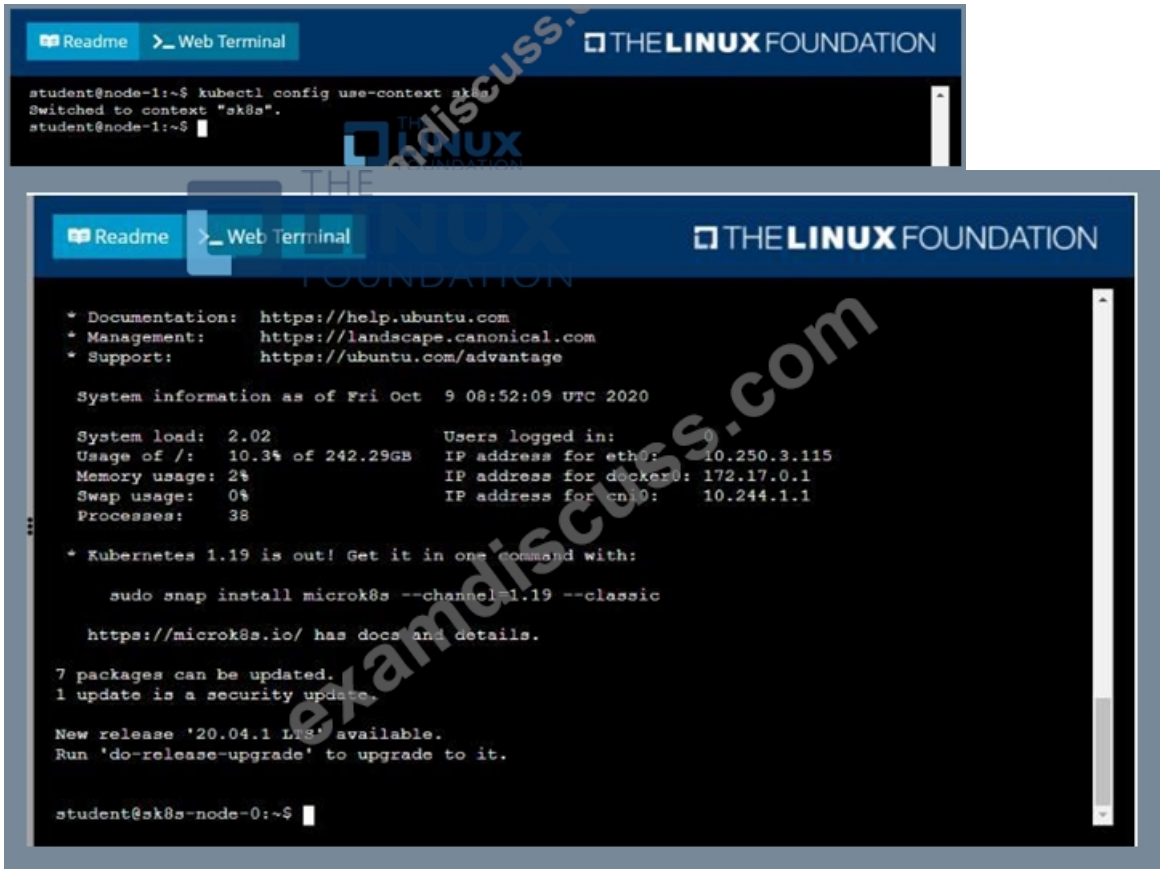
Context
A project that you are working on has a requirement for persistent data to be available.
Task
To facilitate this, perform the following tasks:

* Create a file on node sk8s-node-0 at /opt/KDSP00101/data/index.html with the content Acct=Finance
* Create a PersistentVolume named task-pv-volume using hostPath and allocate 1Gi to it, specifying that the volume is at /opt/KDSP00101/data on the cluster's node. The configuration should specify the access mode of ReadWriteOnce . It should define the StorageClass name exam for the PersistentVolume , which will be used to bind PersistentVolumeClaim requests to this PersistenetVolume.
* Create a PefsissentVolumeClaim named task-pv-claim that requests a volume of at least 100Mi and specifies an access mode of ReadWriteOnce
* Create a pod that uses the PersistentVolmeClaim as a volume with a label app: my-storage-app mounting the resulting volume to a mountPath /usr/share/nginx/html inside the pod



Answer:

Explanation:
See the solution below.
Explanation
Solution:




Readme
Web Terminal
THE LINUX FOUNDATION
student@sk8s-node-0:~$ echo 'Acct=Finance' > /opt/KDSP00101/data/index.html
student@sk8s-node-0:~$ vim pv.yml


Readme
Web Terminal
THE LINUX FOUNDATION
-- INSERT --
0,1
All


Readme
Web Terminal
THE LINUX FOUNDATION
apiVersion: v1
kind: PersistentVolume
metadata:
name: task-pv-volume
spec:
capacity:
storage: 1Gi
accessModes:
- ReadWriteOnce
storageClassName: storage
hostPath:
path: /opt/KDSP00101/data
type: Directory


Readme
Web Terminal
THE LINUX FOUNDATION
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
name: task-pv-claim
spec:
accessModes:
- ReadWriteOnce
resources:
requests:
storage: 100Mi

NEW QUESTION # 75

You are managing a Kubernetes cluster that runs several microservices. One of these services, called "web-app", needs to have its pods scaled based on the current load. You have created a custom resource called "autoscaling.k8s.i0/v1 alphal" which represents the desired number of replicas for the "web-app" service- Implement a Kubernetes Controller that watches for changes in this custom resource and automatically scales the "web-app" Deployment accordingly.

Answer:

Explanation:
See the solution below with Step by Step Explanation.
Explanation:
Solution (Step by Step) :
1. Create the Custom Resource Definition (CRD):
- Define the custom resource "autoscaling.k8s.io/v1alpha1" using the following YAML file:

```
apiVersion: apiextensions.k8s.io/v1
kind: CustomResourceDefinition
metadata:
  name: autoscalings.autoscaling.k8s.io
spec:
  group: autoscaling.k8s.io
  versions:
  - name: v1alpha1
    served: true
    storage: true
  scope: Namespaced
  names:
    plural: autoscalings
    singular: autoscaling
```


- Apply the CRD using 'kubectl apply -f crd.yamr 2. Create the Custom Resource: - Create an instance of the custom resource 'Autoscaling" with the desired number of replicas for the "web-app" Deployment:

```
apiVersion: autoscaling.k8s.io/v1alpha1
kind: Autoscaling
metadata:
  name: web-app-autoscaler
spec:
  replicas: 3
```


- Apply the custom resource using 'kubectl apply -t autoscaling-yamr 3. Create the Kubernetes Controller: - Create a Kubernetes Controller that watches for changes in the "Autoscaling" custom resource and updates the "web-app" Deployment.

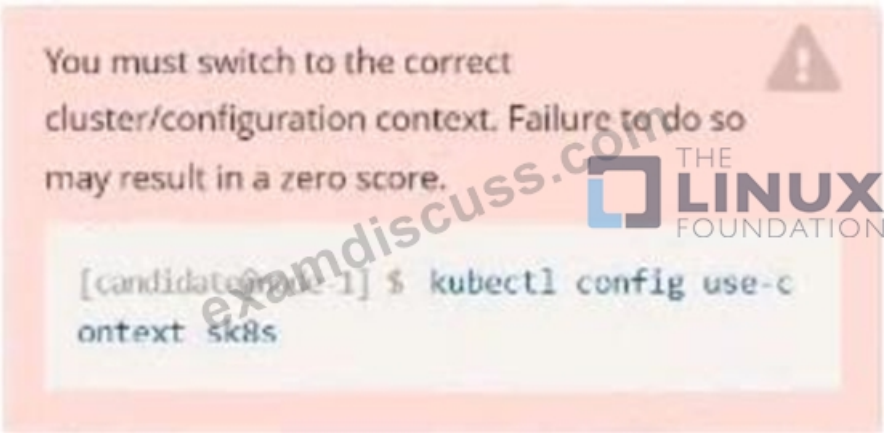
```
go
package main

import (
"context"
appsv1 "k8s.io/api/apps/v1"
corev1 "k8s.io/api/core/v1"
metav1 "k8s.io/apimachinery/pkg/apis/meta/v1"
"k8s.io/apimachinery/pkg/runtime"
"k8s.io/apimachinery/pkg/runtime/schema"
"k8s.io/apimachinery/pkg/watch"
"k8s.io/client-go/kubernetes"
"k8s.io/client-go/rest"
"k8s.io/client-go/tools/cache"
"k8s.io/client-go/tools/record"
"k8s.io/client-go/util/workqueue"
"sigs.k8s.io/controller-runtime/pkg/client"
"sigs.k8s.io/controller-runtime/pkg/controller"
"sigs.k8s.io/controller-runtime/pkg/handler"
"sigs.k8s.io/controller-runtime/pkg/manager"
"sigs.k8s.io/controller-runtime/pkg/reconcile"
"sigs.k8s.io/controller-runtime/pkg/source"
)
// Define the custom resource schema
var (
scheme = runtime.NewScheme()
gvk = schema.GroupVersionKind{
Group: "autoscaling.k8s.io",
Version: "v1alpha1",
Kind: "Autoscaling",
}
)

func init() {
_ = corev1.AddToScheme(scheme)
_ = appsv1.AddToScheme(scheme)
_ = metav1.AddToGroupVersion(scheme, schema.GroupVersion{Group: "autoscaling.k8s.io", Version: "v1alpha1"})
}
```

```
}

// Define the controller logic
func reconcileAutoscaling(request reconcile.Request, c client.Client) (reconcile.Result, error) {
// Fetch the Autoscaling resource
autoscaling := &autoscalingv1alpha1.Autoscaling{}
err := c.Get(context.Background(), request.NamespacedName, autoscaling)
if err != nil {
// Handle error
return reconcile.Result{}, err
// Fetch the web-app Deployment
deployment := &appsv1.Deployment{}
err = c.Get(context.Background(), request.NamespacedName, deployment)
if err != nil {
// Handle error
return reconcile.Result{}, err
}

// Update the Deployment's replicas
deployment.Spec.Replicas = &autoscaling.Spec.Replicas
err = c.Update(context.Background(), deployment)
if err != nil {
// Handle error
return reconcile.Result{}, err
}

return reconcile.Result{}, nil
}
func main() {
// Create a Kubernetes client
cfg, err := rest.InClusterConfig()
if err != nil {
panic(err)
}
clientset, err := kubernetes.NewForConfig(cfg)
if err != nil {
panic(err)
}

// Create a manager
mgr, err := manager.New(cfg, manager.Options{Scheme: scheme})
if err != nil {
panic(err)
}

// Create a controller for the Autoscaling custom resource
err = controller.New("autoscaling-controller", mgr, controller.Options{Reconciler: &ReconcileAutoscaling{client: mgr.GetClient(), scheme:
mgr.GetScheme(), recorder: mgr.GetEventRecorderFor("autoscaling-controller")}})
if err != nil {
panic(err)
}
// Watch for changes in the Autoscaling custom resource
err = mgr.GetFieldIndexer().IndexField(context.Background(), &autoscalingv1alpha1.Autoscaling{}, "metadata.name", func(rawObj runtime.Object)
[]string {
autoscaling := rawObj.(autoscalingv1alpha1.Autoscaling)
return []string{autoscaling.GetName()}
})
if err != nil {
panic(err)
}

// Create a new source for the controller
source := &source.Kind{Type: &autoscalingv1alpha1.Autoscaling{}}

// Create a new event handler for the controller
handler := &handler.EnqueueRequestForObject{}

// Create a new controller for the Autoscaling custom resource
err = mgr.Add(controller.New("autoscaling-controller", mgr, controller.Options{Reconciler: &ReconcileAutoscaling{client: mgr.GetClient(), scheme:
mgr.GetScheme(), recorder: mgr.GetEventRecorderFor("autoscaling-controller")}})).
Watch(source, handler)
if err != nil {
panic(err)
}
// Start the manager
if err := mgr.Start(ctrl.SetupSignalHandler()); err != nil {
panic(err)
}
}
```


4. Deploy the Controller: - Build and deploy tne controller to your Kubernetes cluster. 5. Verify the Controllers Functionality: - Make a change to the "Autoscaling" custom resource (e.g., increase the desired replicas). - Observe that the "web-app" Deployment is automatically scaled based on the new desired replica count. This code implements a basic Kubernetes Controller that monitors the "Autoscaling" custom resource. When the desired replicas are changed, the controller updates the "web-appt' Deployment, ensuring the desired number of replicas is maintained. Note: This example assumes that the "web-app" Deployment exists in the same namespace as the "Autoscaling" custom resource. You might need to adapt the code for different deployments and

namespaces.,

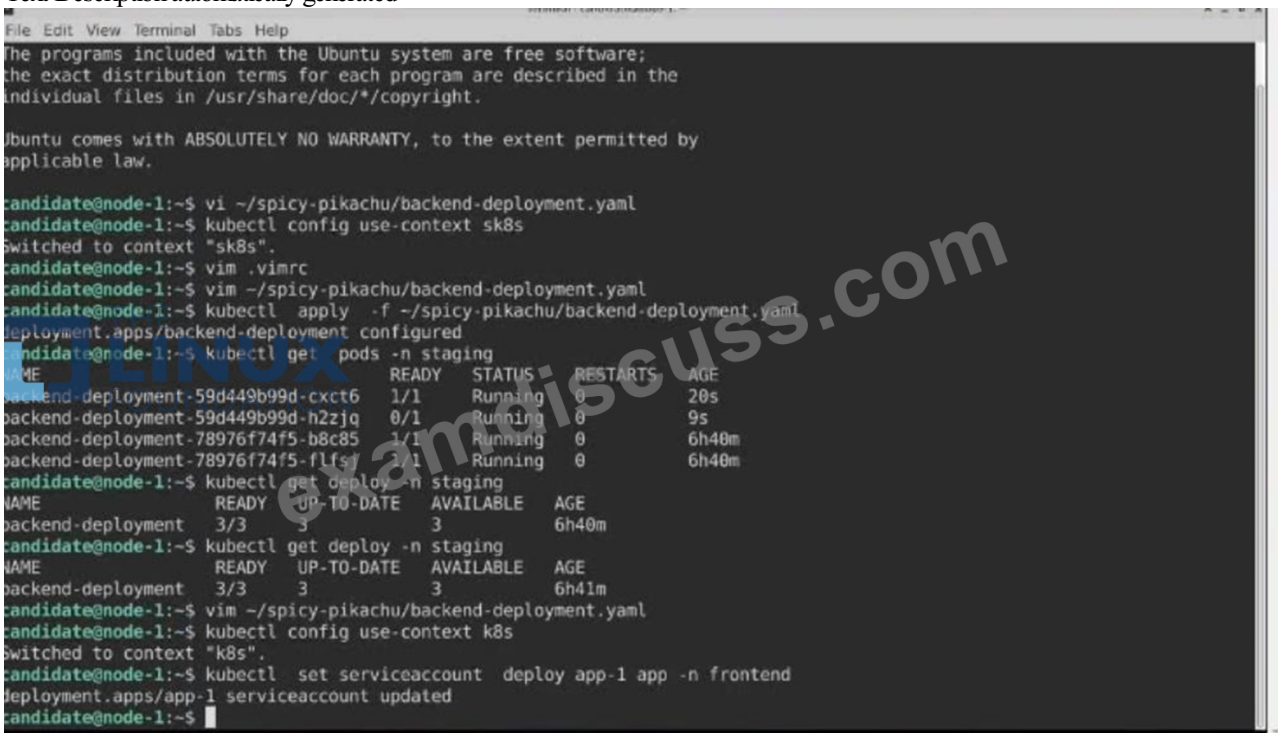
NEW QUESTION # 76



Task:
Update the Deployment app-1 in the frontend namespace to use the existing ServiceAccount app.

Answer:

Explanation:
See the solution below.
Explanation
Solution:
Text Description automatically generated



NEW QUESTION # 77
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