CKA 练习题解析

第 1 题

创建一个名为 deployment-clusterrole 且仅允许创建以下资源类型的新 ClusterRole:

- Deployment
- StatefulSet
- DaemonSet

在现有的 namespace app-team1 中创建一个名为 cicd-token 的新 ServiceAccount。

限于 namespace app-team1，将新的 ClusterRole deployment-clusterrole 绑定到新的 ServiceAccount cicd-token

解题：

```
vim cka-01-clusterrole.yaml

apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRole
metadata:
  name: deployment-clusterrole
rules:
- apiGroups:
  - apps
  resources:
  - daemonsets
  - deployments
  - statefulsets
  verbs:
  - create

kubectl apply -f cka-01-clusterrole.yaml

kubectl create ns app-team1

kubectl create sa cicd-token -n app-team1

kubectl create rolebinding cicd-token-rolebinding
--serviceaccount=app-tema1:cicd-token --role=deployment-clusterrole -n app-team1

kubectl delete deployment test-busybox -n app-team1
```

第 2 题

将一个名为 ek8s-node-1 的节点设置为不可用并将其上的 pod 重新调度

解题：

```
kubectl drain node ek8s-node-1 --ignore-daemonsets
```

第 3 题

Given an existing kubernetes cluster running version 1.18.8, upgrade all of the kubernetes control plain and node components on the master node only to version 1.19.0.
you are also expected to upgrade kubelet and kubectl on the master node

tips: Be sure to drain the master node before upgrading it and uncordon it after the upgrade.
Do not upgrade the worker nodes,etcd,the container manager,the CNI plugin, the DNS service or any other addons.

解题：

```
apt update -y

#apt-cache madison kubeadm

apt upgrade kubeadm=1.20.2-00 kubelet=1.20.2-00 kubectl=1.20.2-00 -y

kubeadm version

kubeadm upgrade plan
kubectl  drain cka01 --ignore-daemonsets
kubeadm upgrade apply v1.20.2 --etcd-upgrade=false

###
###[upgrade/successful] SUCCESS! Your cluster was upgraded to "v1.20.2". Enjoy!

###[upgrade/kubelet] Now that your control plane is upgraded, please proceed with upgrading your kubelets if you haven't already done so.
###

kubectl uncordon cka01
```

第 4 题

首先，为运行在 https://127.0.0.1:2379 上的现有 etcd 实例创建快照并将快照保存至 /data/bucket/etcd-snapshot.db
然后还原位于/srv/data/etcd-snaphot-previous.db 的现有先前快照

提示： 为给定实例创建快照预计在几秒内完成。如果该操作似乎挂起，则命令可能有问题。用 ctrl+c 来取消操作，然后重试。

提供了以下 TLS 证书和密钥，以通过 etcdctl 连接到服务器

- CA 证书：/opt/KUIN00601/ca.crt
- 客户端证书： /opt/KUIN00601/etcd-client.crt
- 客户端密钥：/opt/KUIN00601/etcd-client.key

解题：

```
export ETCDCTL_API=3

etcdctl      --endpoints=https://127.0.0.1:2379      --cacert=/opt/KUIN00601/ca.crt
--cert=/opt/KUIN00601/etcd-client.crt --key=/opt/KUIN00601/etcd-client.key snapshot
save /data/backup/etcd-snapshot.db



# etcdctl snapshot restore /data/backup/etcd-snapshot.db
# rm -rf default.etcd



etcdctl snapshot restore /srv/data/etcd-snapshot-previous.db

sudo systemctl stop etcd

# owner: etcd
ll /var/lib/etcd

mv /var/lib/etcd/default  /tmp/default.bak

mv ~/default.etcd /var/lib/etcd/default

chown etcd.etcd -R /var/lib/etcd/default

sudo systemctl start etcd
```

第 5 题

创建一个名为 allow-port-from-namespace 的新 NetworkPolicy，以允许现有 namespace internal 中的 Pods 连接到同一 namespace 中其他 Pods 的端口 8080。

确保新的 NetworkPolicy：

- 不允许对没有在监听端口 8080 的 pods 的访问

- 不允许不来自 namespace internal 的 pods 的访问

解题：

```
apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
  name: allow-port-from-namespace
  namespace: internal
spec:
  podSelector: {}
  policyTypes:
  - Ingress
  - Egress
  ingress:
  - from:
    - podSelector: {}
    ports:
    - protocol: TCP
      port: 8080
    - protocol: UDP
      port: 8080
  egress:
  - to:
    - podSelector: {}
    ports:
    - protocol: TCP
      port: 8080
    - protocol: UDP
      port: 8080

kubectl create ns internal
kubectl apply -f allow-port-from-namespace.yaml
```

第 6 题

Reconfigure the existing deployment front-end and add a port specification named http exposing port 80/tcp of existing container nginx.
Create a new service named front-end-svc exposing the container port http.
Configure the new service to also expose the individual Pods via a NodePort on the nodes on which they are scheduled

解题：

```
#front-end.yaml

apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    app: front-end
  name: front-end
spec:
  replicas: 1
  selector:
    matchLabels:
      app: front-end
  strategy: {}
  template:
    metadata:
      labels:
        app: front-end
    spec:
      containers:
      - image: nginx
        name: nginx
        resources: {}

# front-end.svc.yaml

apiVersion: v1
kind: Service
metadata:
  labels:
    app: front-end-svc
  name: front-end-svc
spec:
  ports:
  - name: 80-80
    port: 80
    protocol: TCP
    targetPort: 80
  selector:
    app: front-end
  type: NodePort

kubectl edit deploy front-end
```

```
        ports:
        - name: http
          containerPort: 80
          protocol: TCP

```



```
kubectl apply -f front-end-svc.yaml
```

第 7 题

Create a new nginx ingress resource as follows:

- Name: ping
- Namespace: ing-interal
- Exposing service hi on path /hi using service port 5678

tips: The availability of service hi can be checked using the following commands,which should retun hi:

curl -KL <INTERNAL_IP>/hi

解题：

```
# config environment

kubectl create ns ing-internal

kubectl   run   hi   --image=registry.cn-zhangjiakou.aliyuncs.com/breezey/ping   -n
ing-internal

kubectl expose pod hi --port=5678 -n ing-internal

# answer

# ping.yaml

apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: ping
  namespace: ing-internal
spec:
```

```
  rules:
  - http:
      paths:
      - path: /hi
        pathType: Prefix
        backend:
          service:
            name: hi
            port:
              number: 5678

kubectl apply -f ping.yaml
```

第 8 题

Scale the deploy persentation to 3 pods

解题：

```
# config env
kubectl create deploy presentation --image=busybox -- sleep 3600

# answer
kubectl scale --replicas=3 deploy/presentation
```

第 9 题

Schedule a pod as follows:

- Name: nginx-kusc00401
- Image: nginx
- Node selector: disk=spinning

解题：

```
# config env

kubectl label node cka03 disk=spinning



# answer

kubectl run nginx-kusc00401 --image=nginx --dry-run=client -o yaml > nginx-kusc00401.yaml
# modify yaml
```

```
# nginx-kusc00401.yaml

apiVersion: v1
kind: Pod
metadata:
  labels:
    run: nginx-kusc00401
  name: nginx-kusc00401
spec:
  nodeSelector:
    disk: spinning
  containers:
  - image: nginx
    name: nginx-kusc00401
    resources: {}
  dnsPolicy: ClusterFirst
  restartPolicy: Always


kubectl apply -f nginx-kusc00401.yaml
```

第 10 题

Check to see how many nodes are ready(not including nodes tainted NoSchedule) and write the number to /opt/KUSCoo402/kusc00402.txt.

解题：

```
for i in `kubectl  get nodes | grep -v NAME | awk '{print $1}'`;do kubectl describe node $i |grep Taints |grep -v NoSchedule;done | wc -l
```

第 11 题

Create a pod named kucc8 with a single app container for each of the following images running inside(there may be between 1 and 4 images specified):
nginx + redis + memcached + consul

解题：

```

```

```
kubectl run kucc8 --image=nginx --dry-run=client -o yaml > kucc8.yaml

# kucc8.yaml

apiVersion: v1
kind: Pod
metadata:
  creationTimestamp: null
  labels:
    run: kucc8
  name: kucc8
spec:
  containers:
  - image: nginx
    name: nginx
  - image: redis
    name: redis
  - image: memcached
    name: memcached
  - image: consul
    name: consul
    resources: {}
  dnsPolicy: ClusterFirst
  restartPolicy: Always
status: {}


kubectl apply -f kucc8.yaml
```

第 12 题

Create a persistent volume with name app-config, of capacity 1Gi and access mode ReadOnlyMany. The type of volume is hostPath and its location is /srv/app-config.

解题：

```
# app-config.yaml

apiVersion: v1
kind: PersistentVolume
metadata:
```

```
  name: app-config
spec:
  capacity:
    storage: 1Gi
  accessModes:
    - ReadOnlyMany
  hostPath:
    path: /srv/app-config

kubectl apply -f app-config.yaml
```

第 13 题

Create a new PersistentVolumeClaim:

- Name: pv-volume
- Class: csi-hostpath-sc
- Capacity: 10Mi

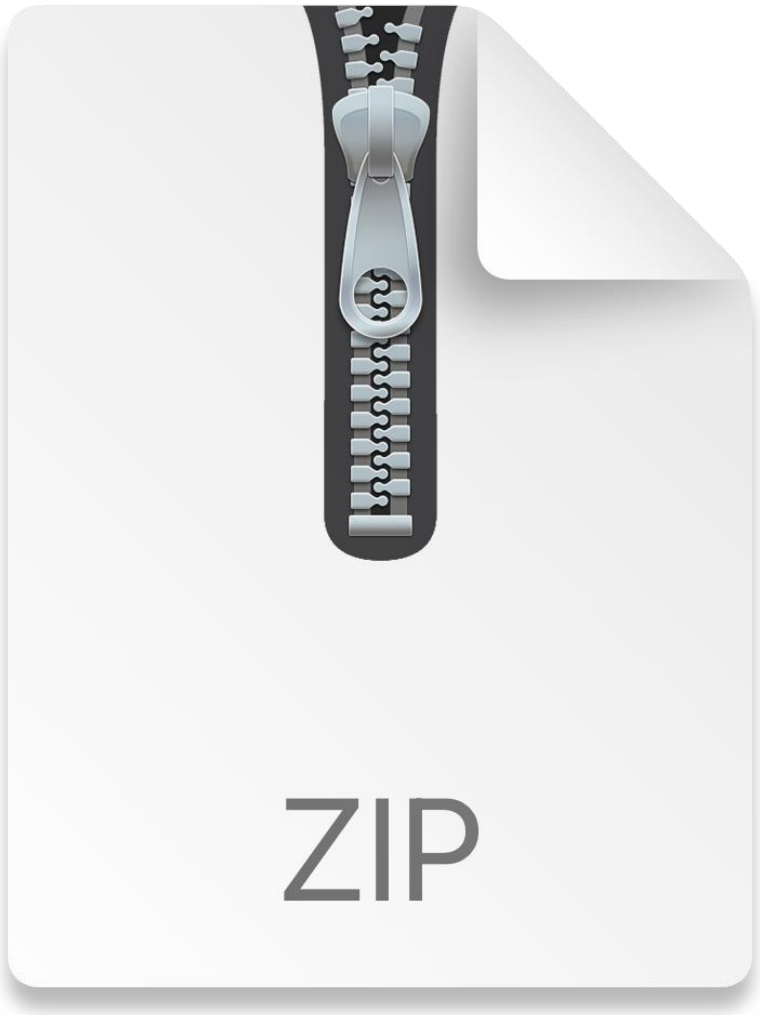
Create a new Pod which mounts the PersistentVolumeClaim as a volume:

- Name: web-server
- Image: nginx
- Mount path: /usr/share/nginx/html

Configure the new Pod to have ReadWriteOnce access on the volume.

Finally, using kubectl edit or kubectl patch expand the PersistentVolumeClaim to a capacity of 70Mi and record that change

解题：




```
# config env


# deploy nfs

apt install -y nfs-kernel-server


vim /etc/exports

/data *(rw,no_root_squash)


mkdir /data

systemctl restart nfs-server
```

```
showmount -e nfs-serverip

chmod 777 -R /data


# deploy nfs-csi

apt install -y lrzsz
# upload nfs-csi.zip

unzip nfs-csi.zip

cd nfs-csi/deploy

kubectl apply -f ./

cd ../

kubectl apply -f csi-hostpath-sc.yaml
kubectl get sc


# answer

# pv-volume.yaml

apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: pv-volume
spec:
  accessModes:
    - ReadWriteOnce
  resources:
    requests:
      storage: 10Mi
  storageClassName: csi-hostpath-sc


kubectl apply -f pv-volume.yaml

kubectl run web-server --image=nginx --dry-run=client -o yaml > web-server.yaml
```

```
# web-server.yaml
apiVersion: v1
kind: Pod
metadata:
  creationTimestamp: null
  labels:
    run: web-server
  name: web-server
spec:
  volumes:
  - name: pv-volume
    persistentVolumeClaim:
      claimName: pv-volume
  containers:
  - image: nginx
    name: web-server
    volumeMounts:
    - mountPath: /usr/share/nginx/html
      name: pv-volume
    resources: {}
  dnsPolicy: ClusterFirst
  restartPolicy: Always
status: {}


kubectl apply -f web-server.yaml

# 修改为 70Mi
kubectl edit pvc pv-volume --record=true
```

第 14 题

Monitor the logs of pod bar and:

- Extract log lines corresponding to error unable-to-access-website
- Write them to /opt/KUTR00101/bar

解题：

```
# config env
```

```
kubectl run bar --image=registry.cn-zhangjiakou.aliyuncs.com/breezey/bar

# answer
kubectl logs bar  |grep unable-to-access-website > /tmp/bar
```

第 15 题

Add a busybox sidecar container to the existing Pod big-corp-app.The new sidecar container has to run the following command:
/bin/sh -c tail -n+1 /var/log/big-corp-app.log

Use a volume mount named logs to make the file /var/log/big-corp-app.log available to the sidecar container

warn: Don't modify the existing container. Don't modify the path of the log file. both containers must access it at /var/log/big-corp-app.log

解题：

```
Config env

vim pod.yml

apiVersion: v1

kind: Pod

metadata:

  name: legacy-app

spec:

  containers:

  - name: count

    image: busybox

    args:

    - /bin/sh
```

```
    - -c
    - >
      i=0;
      while true;
      do
        echo "$(date) INFO $i" >> /var/log/legacy-ap.log;
        i=$((i+1));
        sleep 1;
      done
kubectl create -f pod.yml
#Answer
新增 pod 和 volume 内容
apiVersion: v1
kind: Pod
metadata:
  name: legacy-app
spec:
  containers:
  - name: count
    image: busybox
    args:
    - /bin/sh
    - -c
```

```
    - >
      i=0;
      while true;
      do
        echo "$(date) INFO $i" >> /var/log/legacy-ap.log;
        i=$((i+1));
        sleep 1;
      done
    volumeMounts:
    - name: logs
      mountPath: /var/log
  - name: busybox
    image: busybox
    args: [/bin/sh, -c, 'tail -n+1 -f /var/log/legacy-ap.log']
    volumeMounts:
    - name: logs
      mountPath: /var/log
  volumes:
  - name: logs
    emptyDir: {}
```

pod 不支持直接修改，确认没问题之后，直接删除 pod 并重建

```
kubectl delete -f pod.yml
pod "legacy-app" deleted
```

```
kubectl create -f pod.yml

pod/legacy-app created
```

第 16 题

From the pod label name=cpu-loader, find pods running high CPU workloads and write the name of the pod consuming most CPU to file /opt/KUTR00401.txt(which alreay exists).

解题：

```
# config env

kubectl create deploy cpu-loader --image=mysql --replicas=5 --dry-run=client -o yaml > cpu-loader.yaml

apiVersion: apps/v1
kind: Deployment
metadata:
  creationTimestamp: null
  labels:
    name: cpu-loader
  name: cpu-loader
spec:
  replicas: 5
  selector:
    matchLabels:
      name: cpu-loader
  strategy: {}
  template:
    metadata:
      creationTimestamp: null
      labels:
        name: cpu-loader
    spec:
      containers:
      - image: mysql
        name: mysql
        env:
        - name: MYSQL_ROOT_PASSWORD
          value: wordpress
```

```
        resources: {}
status: {}


kubectl apply -f cpu-loader.yaml


# answer

kubectl top pods -l name=cpu-loader | sort -k2 -nr | head -1 | awk '{print $1}' >
/tmp/cpu-loader.txt
```

第 17 题

A kubernetes worker node, named wk8s-node-0 is in state NotReady. Investigate why this is the case, and perform any appropriate steps to bring the node to a Ready state,ensuring that any changes are made permanent.

tips:

you can ssh to the failed node using:
ssh wk8s-node-0

you can assume elevated privileges on the node with the following command：
sudo -i

解题：

```
systemctl start docker

systemctl start kubelet

systemctl enable kubelet docker
```