Exam : **CKA**

Title : Certified Kubernetes Administrator (CKA) Program Exam

Vendor : Linux Foundation

Version : V13.95

QUESTION NO: 1
List pod logs named "frontend" and search for the pattern "started" and write it to a file "/opt/error-logs"
Answer:
Kubectl logs frontend | grep -i "started" > /opt/error-logs

QUESTION NO: 2
Create 2 nginx image pods in which one of them is labelled with env=prod and another one labelled with env=dev and verify the same.
Answer:
kubectl run --generator=run-pod/v1 --image=nginx -- labels=env=prod nginx-prod --dry-run -o yaml > nginx-prodpod.yaml Now, edit nginx-prod-pod.yaml file and remove entries like "creationTimestamp: null" "dnsPolicy: ClusterFirst" vim nginx-prod-pod.yaml apiVersion: v1
kind: Pod metadata:
labels:
env: prod
name: nginx-prod
spec:
containers:
- image: nginx
name: nginx-prod
restartPolicy: Always
kubectl create -f nginx-prod-pod.yaml
kubectl run --generator=run-pod/v1 --image=nginx --
labels=env=dev nginx-dev --dry-run -o yaml > nginx-dev-pod.yaml
apiVersion: v1
kind: Pod
metadata:
labels:
env: dev
name: nginx-dev
spec:
containers:
- image: nginx
name: nginx-dev
restartPolicy: Always
kubectl create -f nginx-prod-dev.yaml
Verify :
kubectl get po --show-labels
kubectl get po -l env=prod
kubectl get po -l env=dev

QUESTION NO: 3
Create an nginx pod and list the pod with different levels of verbosity
Answer:

```
// create a pod
kubectl run nginx --image=nginx --restart=Never --port=80
// List the pod with different verbosity
kubectl get po nginx --v=7
kubectl get po nginx --v=8
kubectl get po nginx --v=9
```

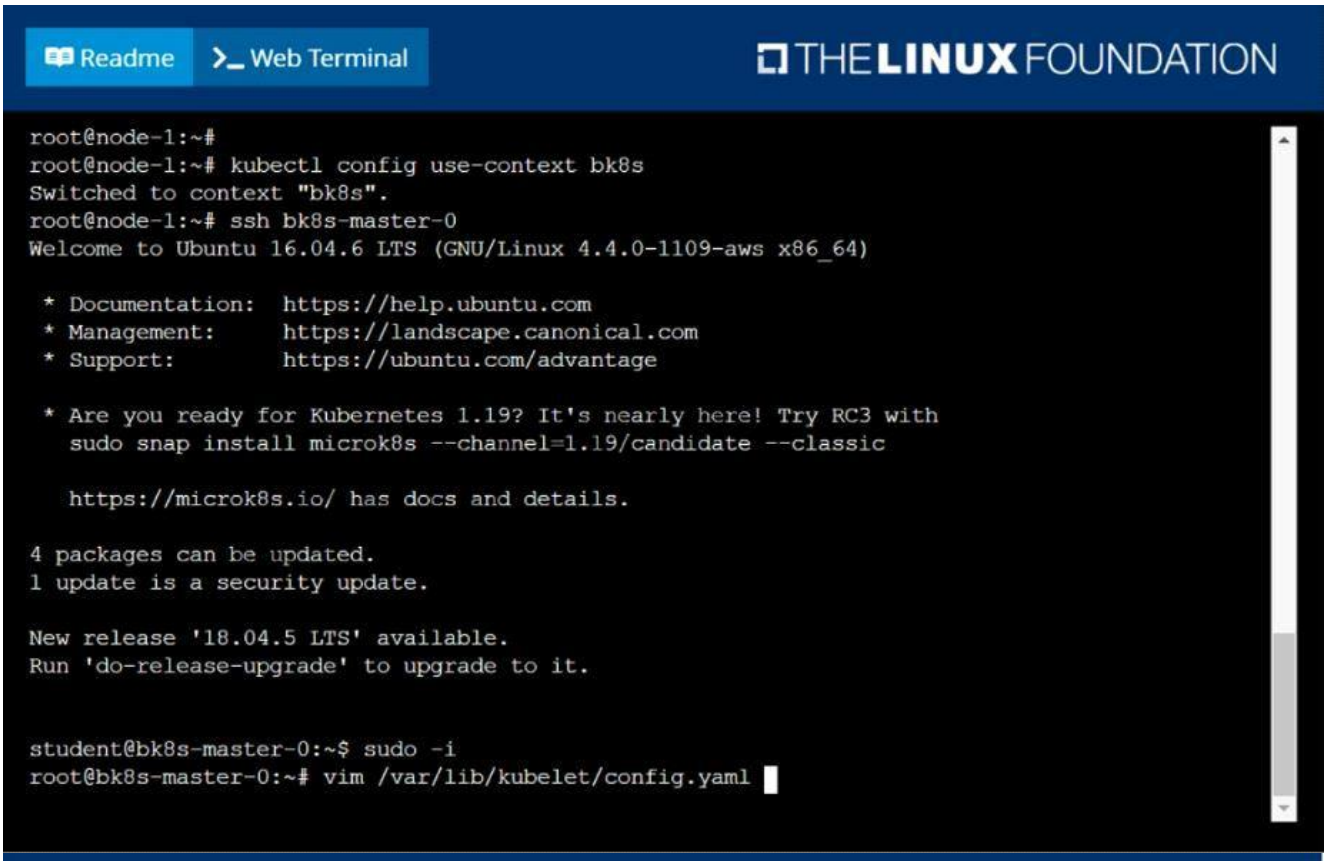
QUESTION NO: 4
Create a pod with environment variables as var1=value1.Check the environment variable in pod

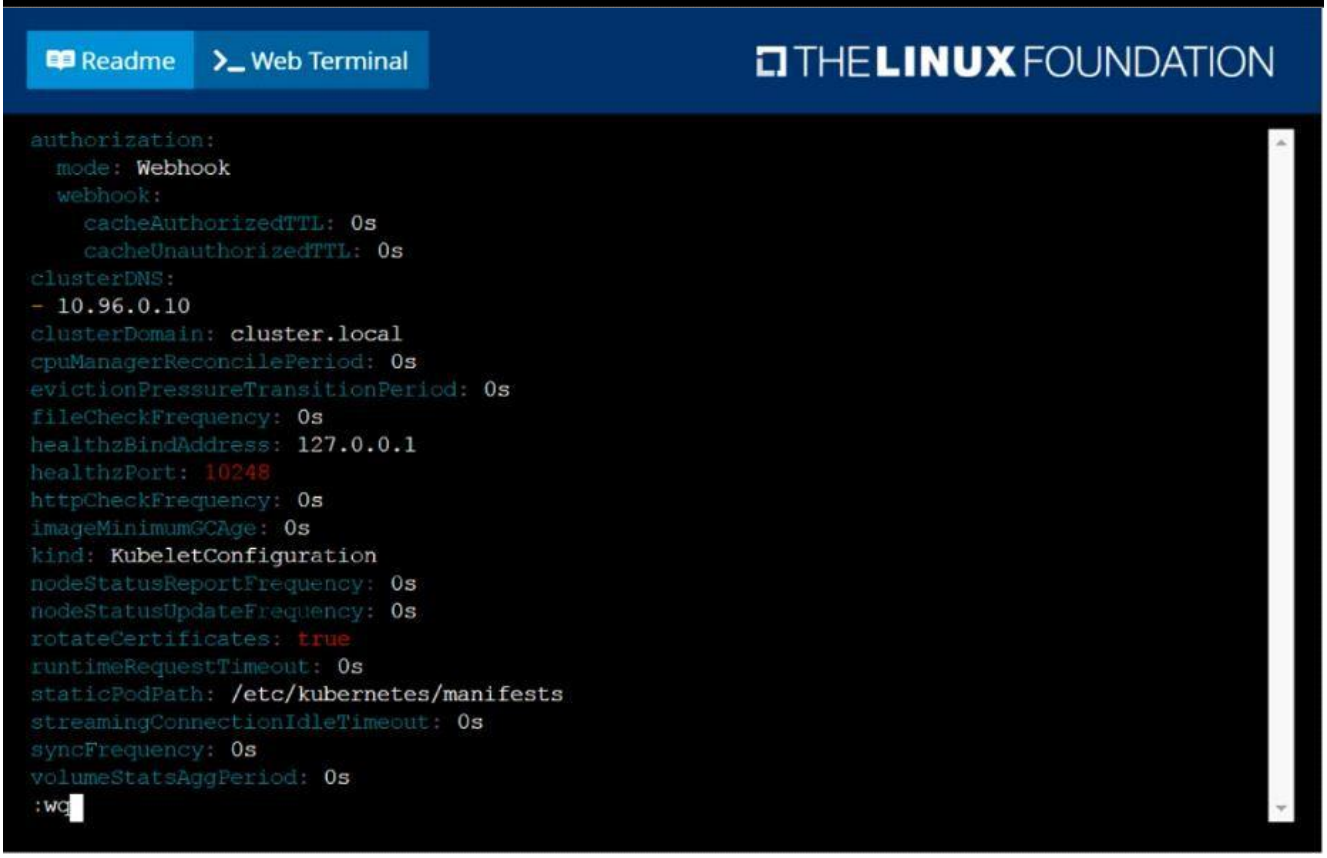
Answer:

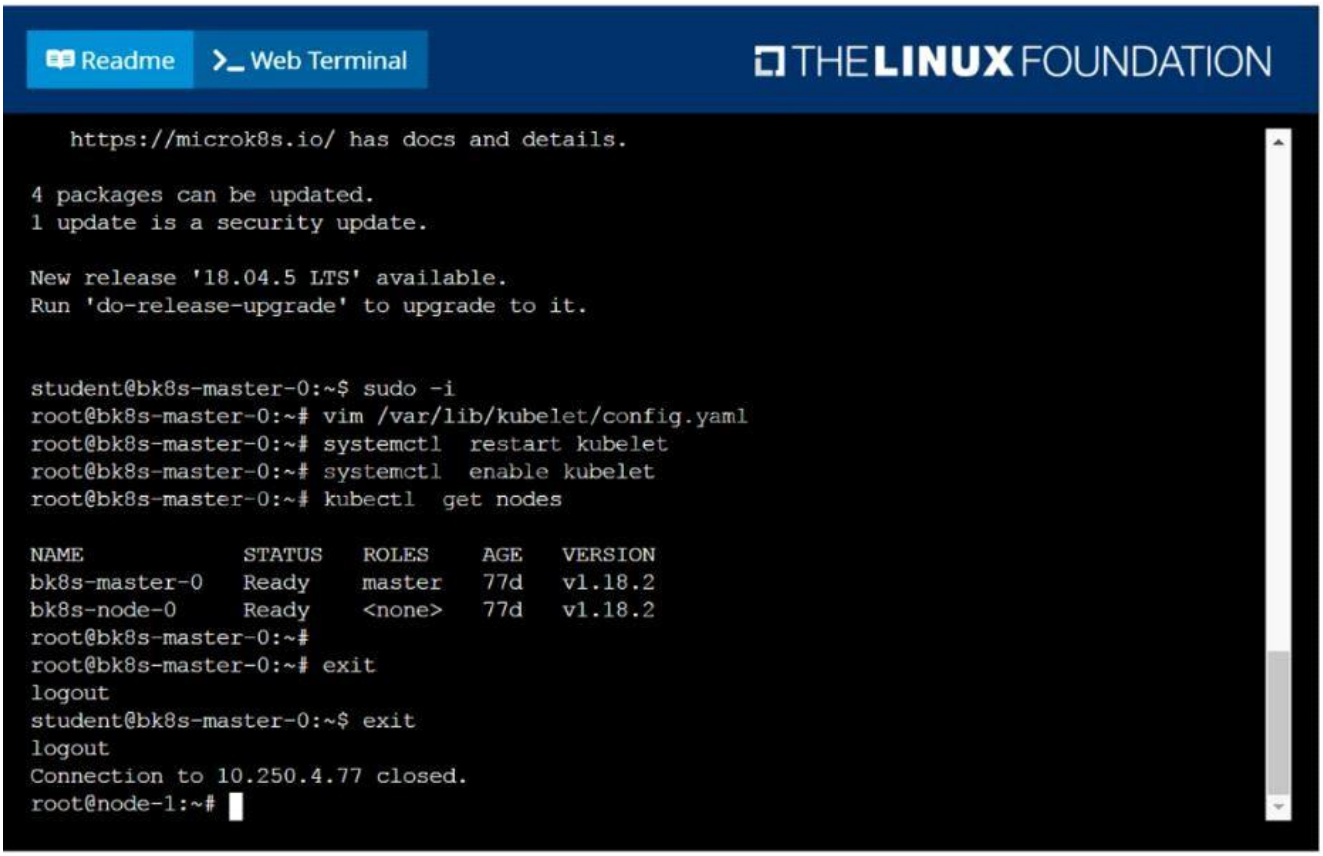
```
kubectl run nginx --image=nginx --restart=Never --env=var1=value1
# then
kubectl exec -it nginx -- env
# or
kubectl exec -it nginx -- sh -c 'echo $var1'
# or
kubectl describe po nginx | grep value1
```

QUESTION NO: 5
Given a partially-functioning Kubernetes cluster, identify symptoms of failure on the cluster. Determine the node, the failing service, and take actions to bring up the failed service and restore the health of the cluster. Ensure that any changes are made permanently.
You can ssh to the relevant I nodes (bk8s-master-0 or bk8s-node-0) using:
[student@node-1] $ ssh <nodename>
You can assume elevated privileges on any node in the cluster with the following command:
[student@nodename] $ | sudo -i

Answer:
solution


Readme
Web Terminal
THE LINUX FOUNDATION
root@node-1:~#
root@node-1:~# kubectl config use-context bk8s
Switched to context "bk8s".
root@node-1:~# ssh bk8s-master-0
Welcome to Ubuntu 16.04.6 LTS (GNU/Linux 4.4.0-1109-aws x86_64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/advantage
* Are you ready for Kubernetes 1.19? It's nearly here! Try RC3 with
sudo snap install microk8s --channel=1.19/candidate --classic
https://microk8s.io/ has docs and details.
4 packages can be updated.
1 update is a security update.
New release '18.04.5 LTS' available.
Run 'do-release-upgrade' to upgrade to it.
student@bk8s-master-0:~$ sudo -i
root@bk8s-master-0:~# vim /var/lib/kubelet/config.yaml

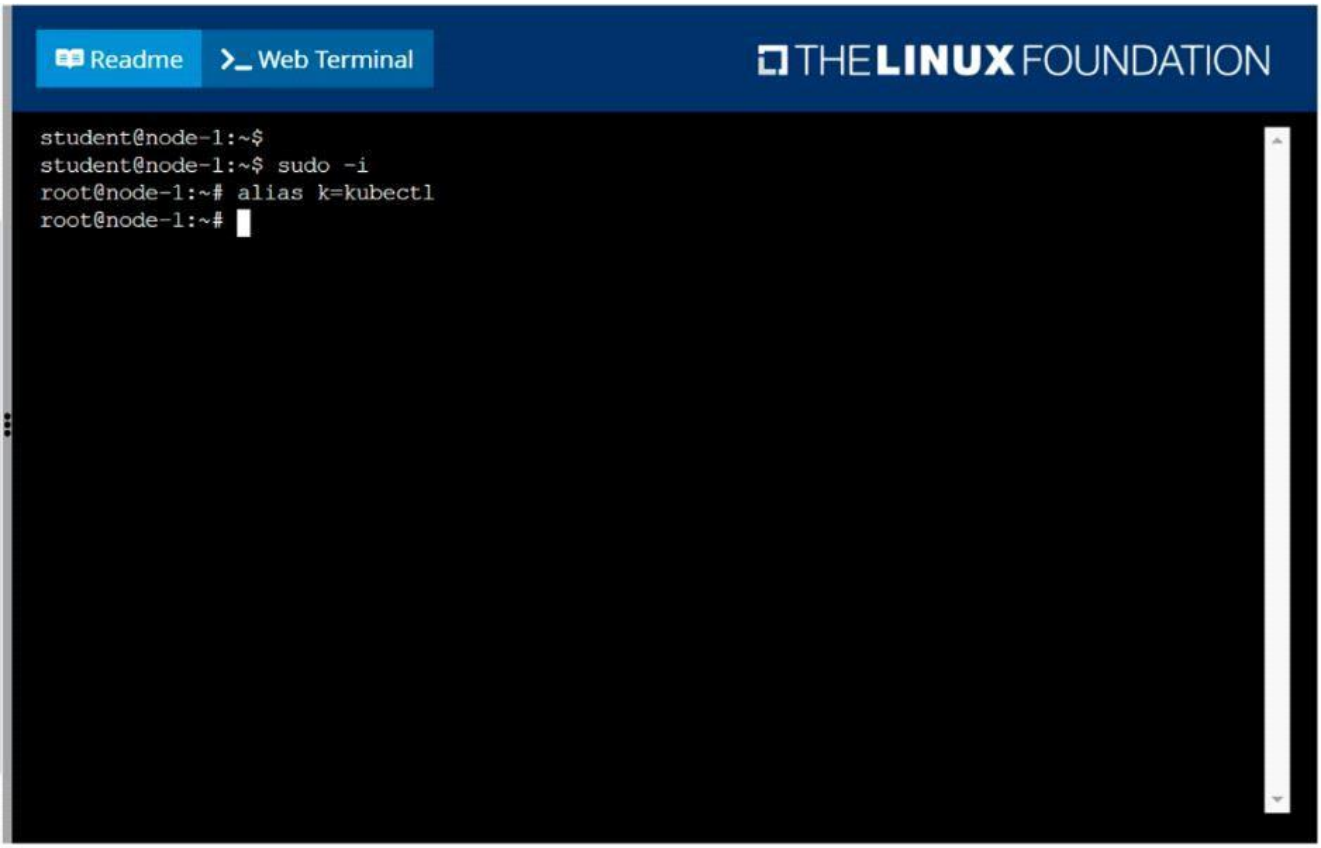

Readme
Web Terminal
THE LINUX FOUNDATION
authorization:
mode: Webhook
webhook:
cacheAuthorizedTTL: 0s
cacheUnauthorizedTTL: 0s
clusterDNS:
- 10.96.0.10
clusterDomain: cluster.local
cpuManagerReconcilePeriod: 0s
evictionPressureTransitionPeriod: 0s
fileCheckFrequency: 0s
healthzBindAddress: 127.0.0.1
healthzPort: 10248
httpCheckFrequency: 0s
imageMinimumGCAge: 0s
kind: KubeletConfiguration
nodeStatusReportFrequency: 0s
nodeStatusUpdateFrequency: 0s
rotateCertificates: true
runtimeRequestTimeout: 0s
staticPodPath: /etc/kubernetes/manifests
streamingConnectionIdleTimeout: 0s
syncFrequency: 0s
volumeStatsAggPeriod: 0s
:wq

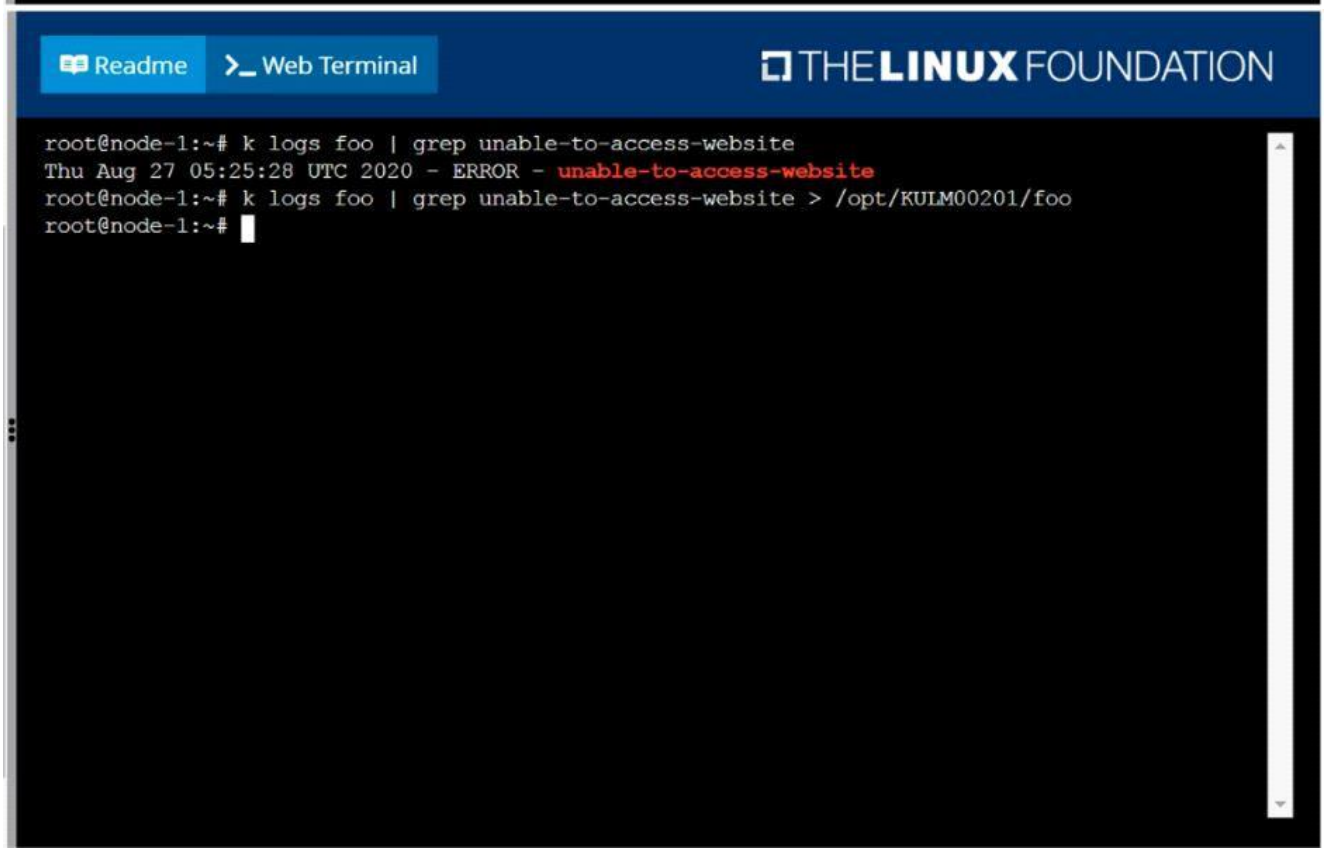


QUESTION NO: 6
List "nginx-dev" and "nginx-prod" pod and delete those pods
Answer:
kubect1 get pods -o wide
kubectl delete po "nginx-dev" kubectl delete po "nginx-prod"

QUESTION NO: 7
Monitor the logs of pod foo and:
Extract log lines corresponding to error
unable-to-access-website
Write them to /opt/KULM00201/foo

Answer:
solution



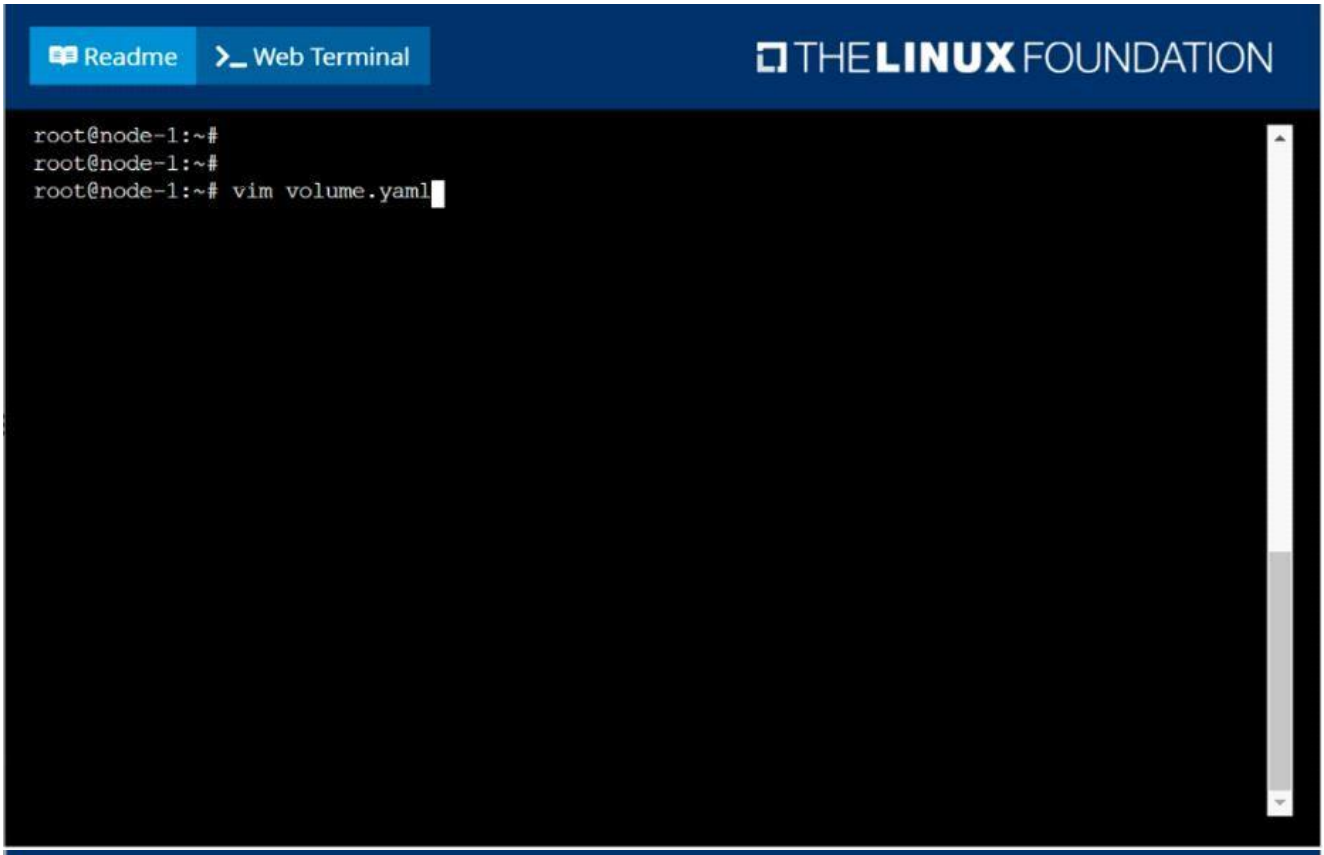


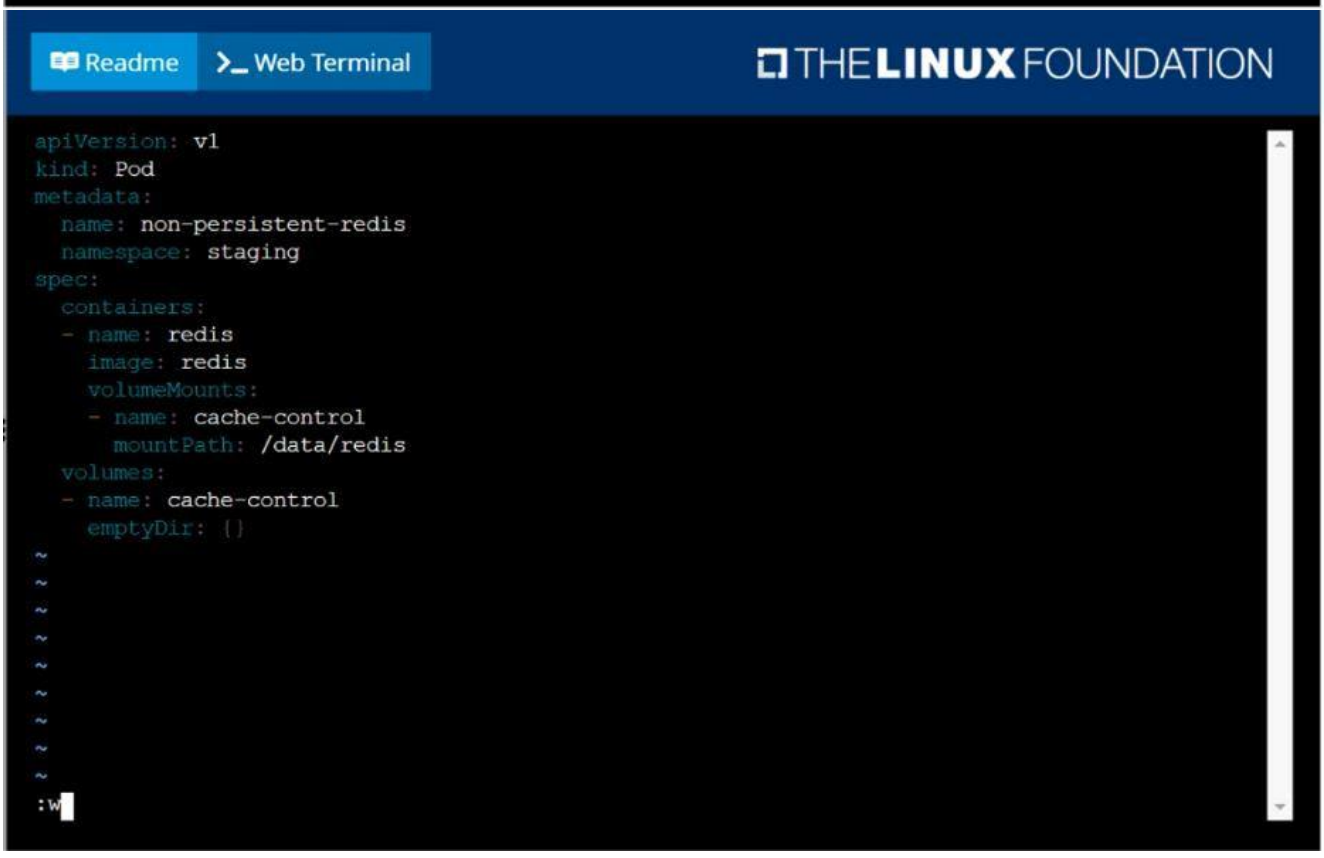
QUESTION NO: 8
Create a pod as follows:
Name: non-persistent-redis
container Image: redis

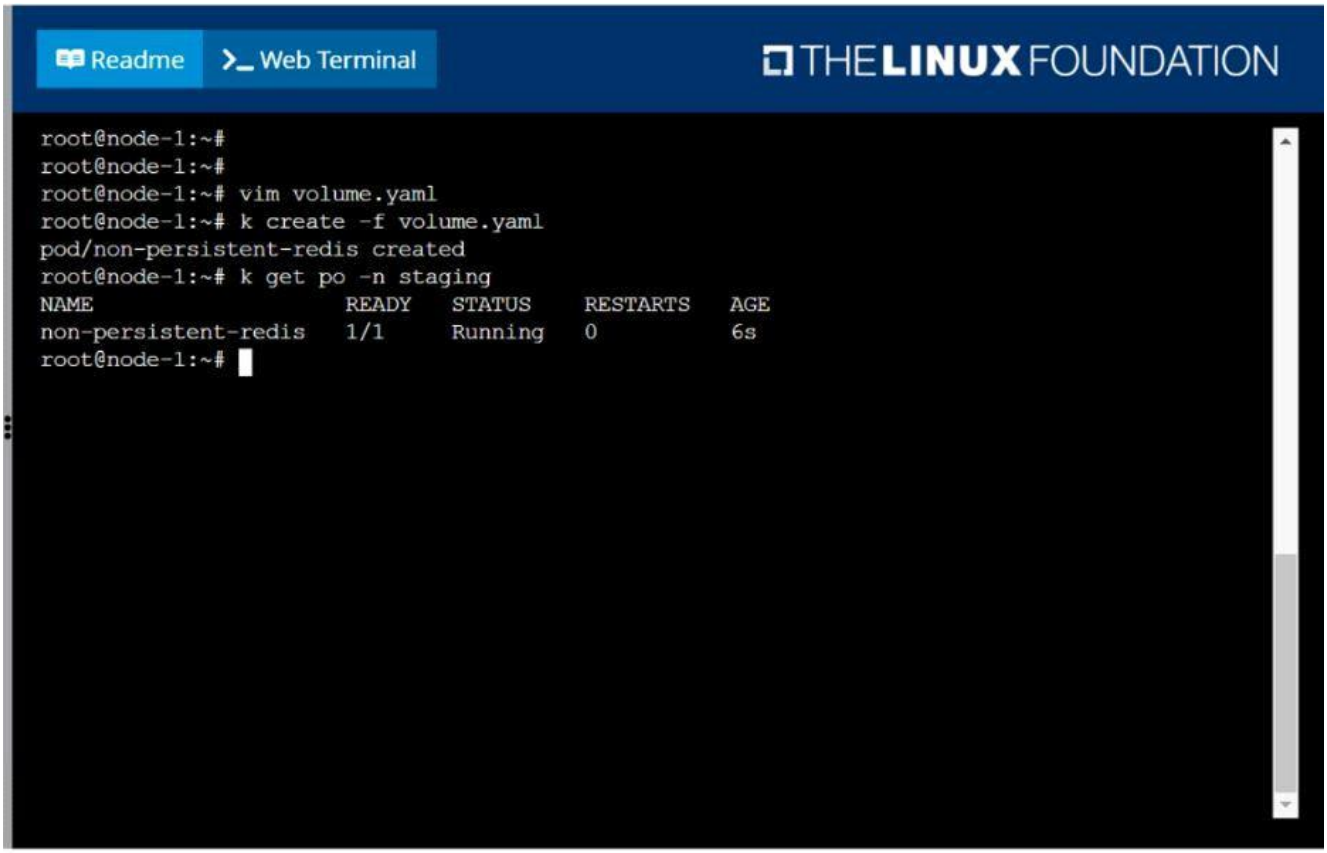
Volume with name: cache-control
Mount path: /data/redis
The pod should launch in the staging namespace and the volume must not be persistent.

Answer:

solution

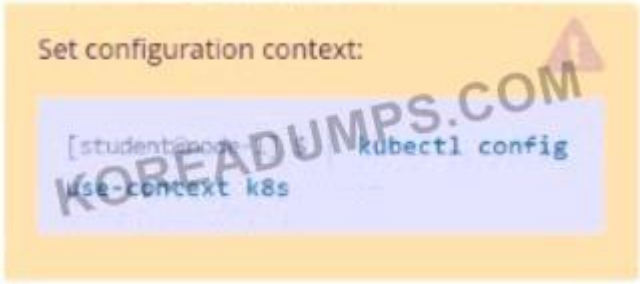




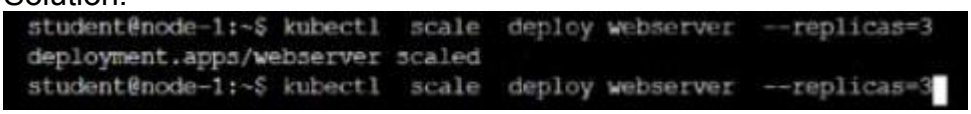


QUESTION NO: 9
Create a pod with image nginx called nginx and allow traffic on port 80
Answer:
kubectl run nginx --image=nginx --restart=Never --port=80

QUESTION NO: 10
Task Weight: 4%



Task
Scale the deployment webserver to 3 pods.
Answer:
Solution:

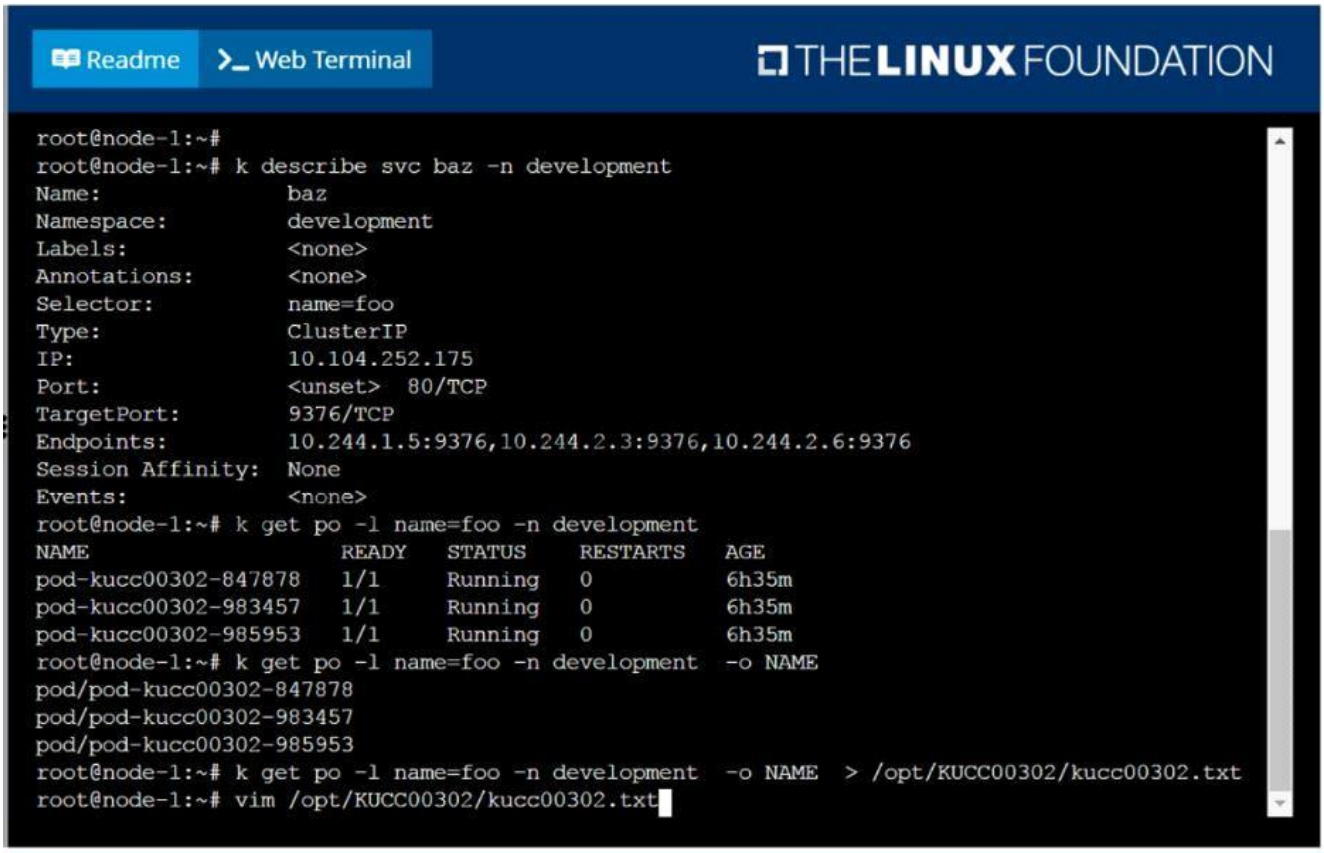


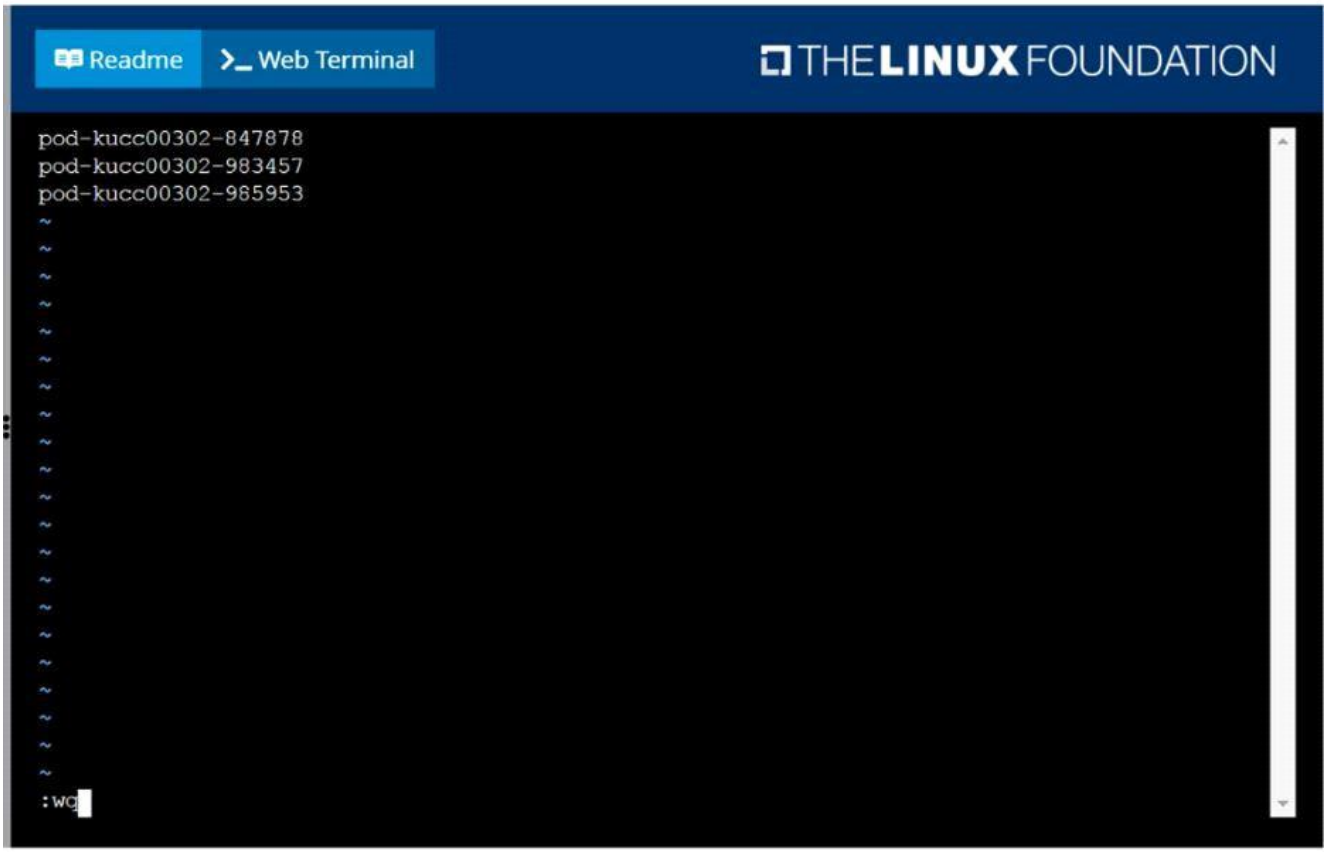
QUESTION NO: 11
Create a file:
/opt/KUCC00302/kucc00302.txt that lists all pods that implement service baz in namespace

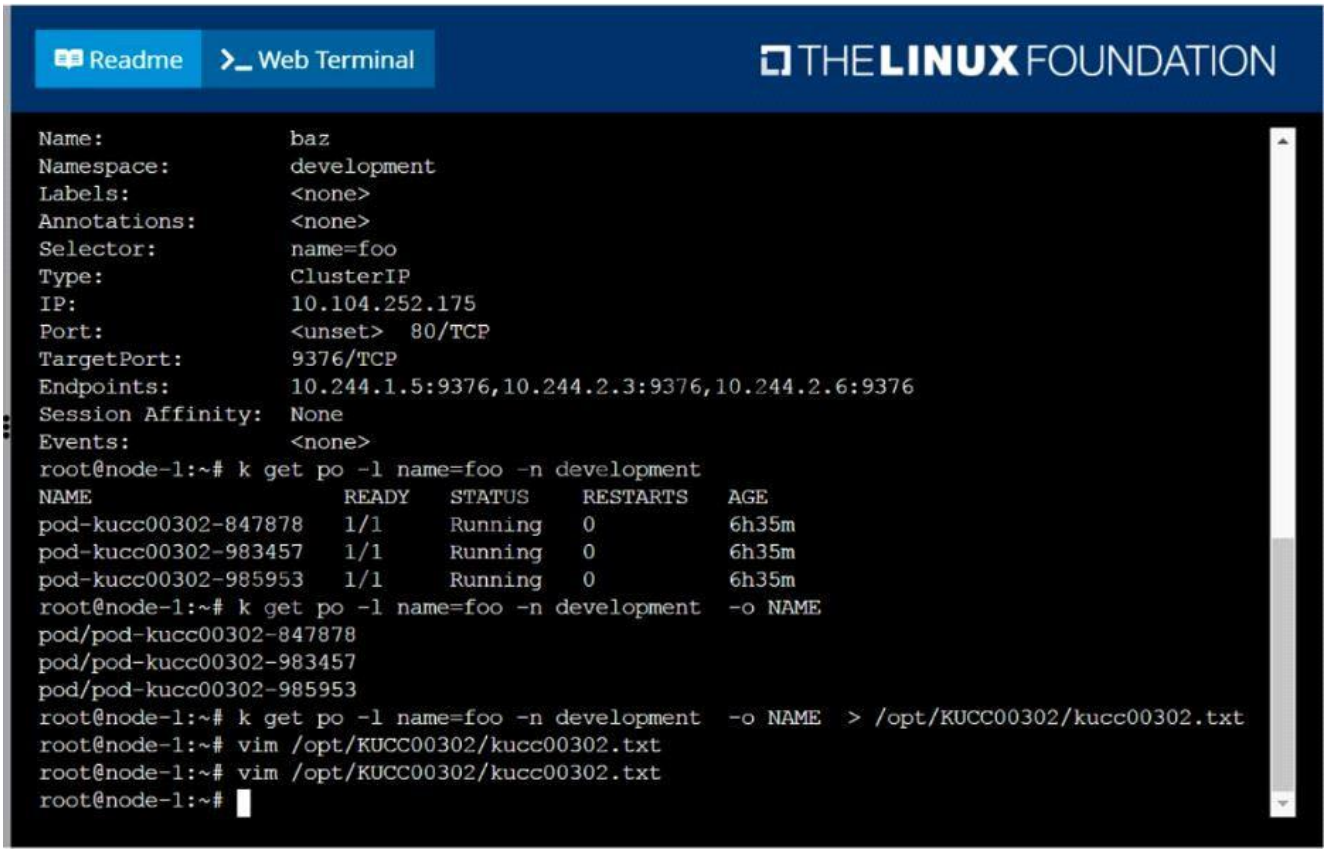
development.
The format of the file should be one pod name per line.

Answer:

solution

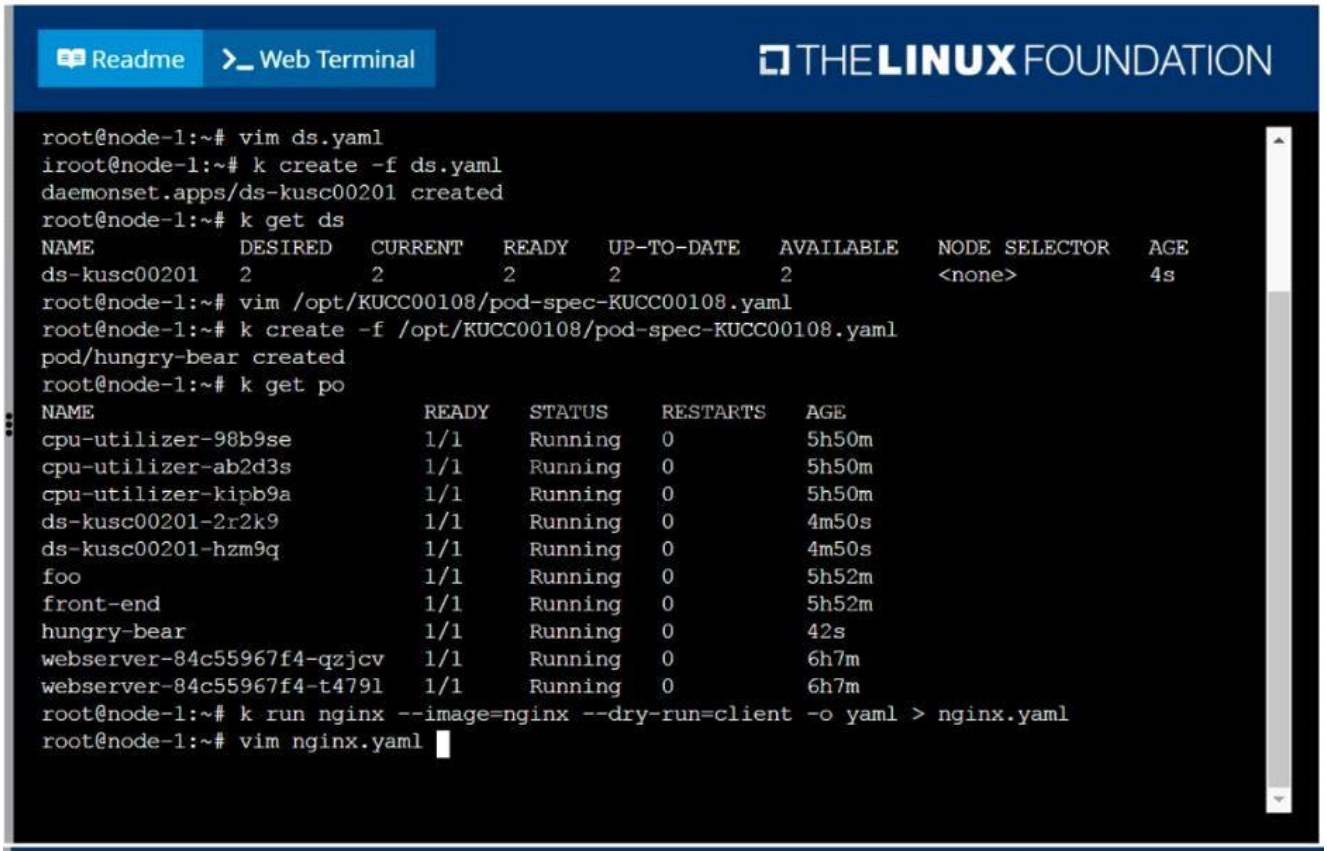


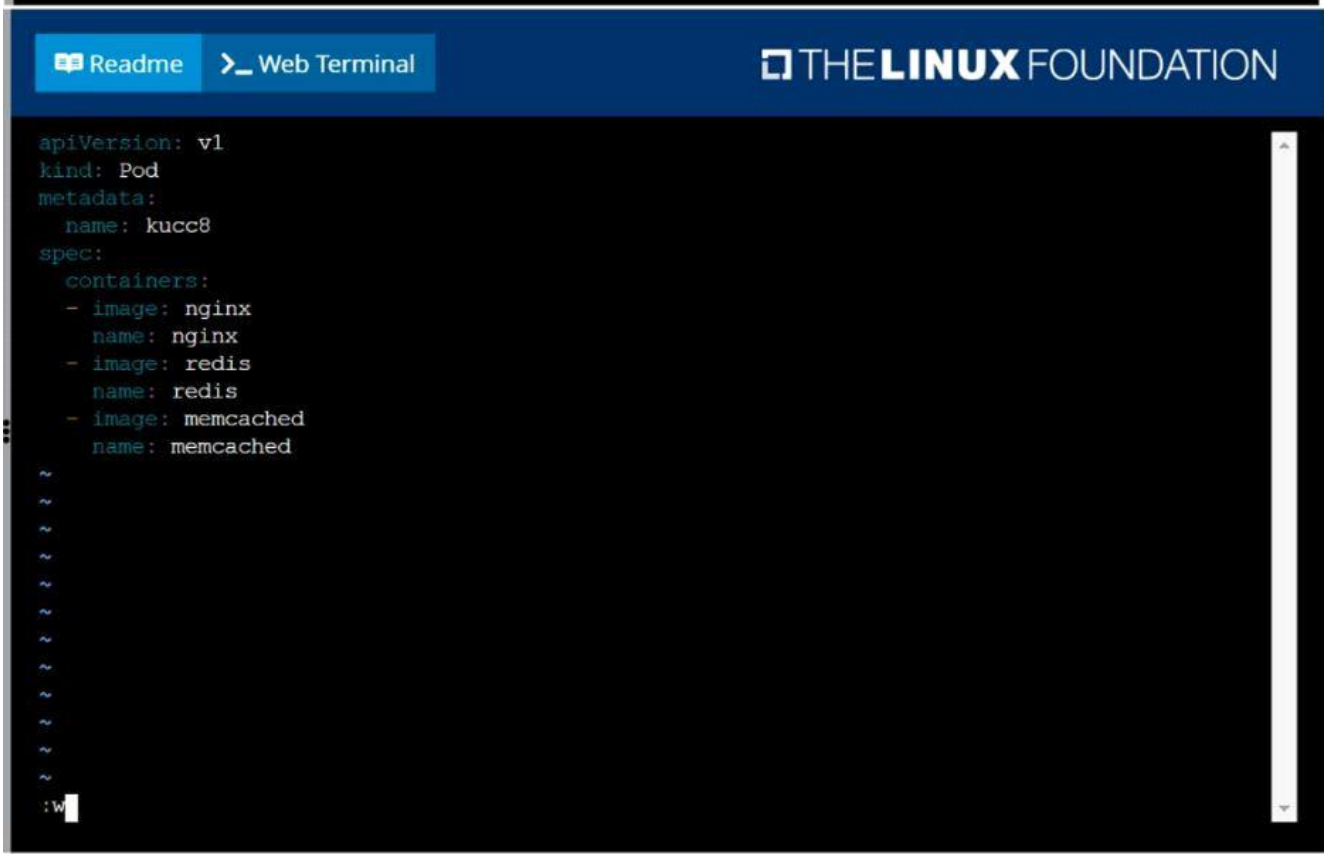


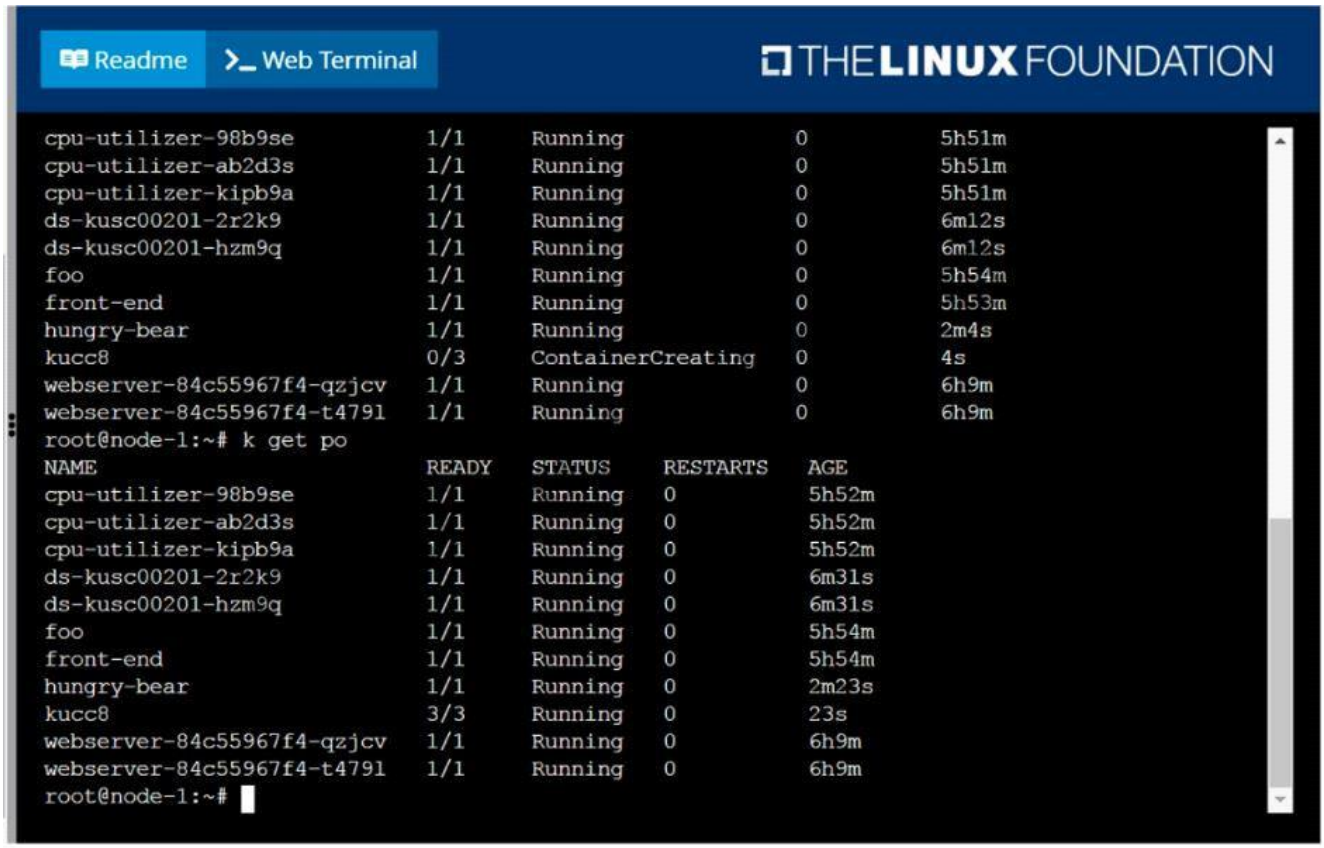


QUESTION NO: 12
Create a pod named kucc8 with a single app container for each of the following images running inside (there may be between 1 and 4 images specified):
nginx + redis + memcached.

Answer:
solution

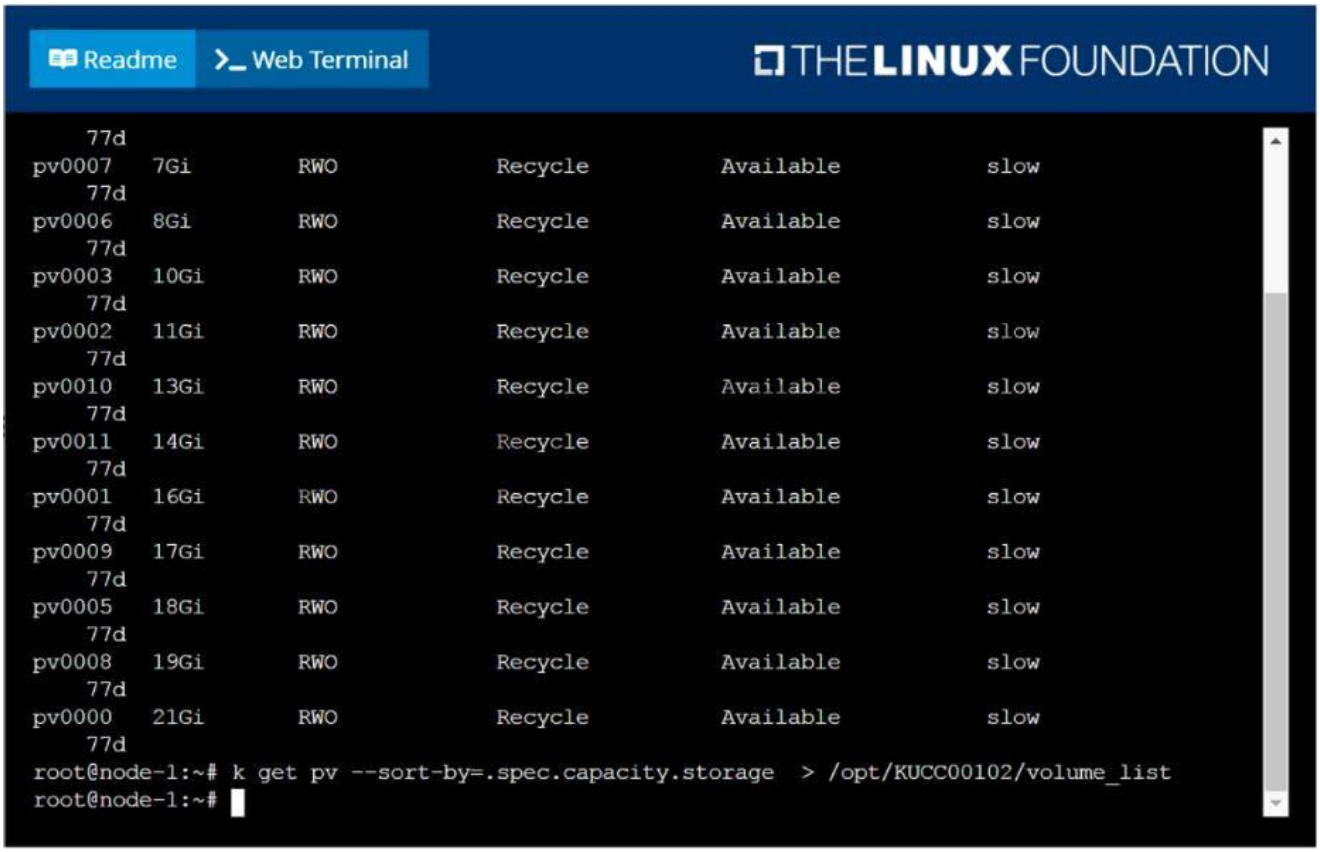

Readme
Web Terminal
THE LINUX FOUNDATION
root@node-1:~# vim ds.yaml
iroot@node-1:~# k create -f ds.yaml
daemonset.apps/ds-kusc00201 created
root@node-1:~# k get ds
NAME DESIRED CURRENT READY UP-TO-DATE AVAILABLE NODE SELECTOR AGE
ds-kusc00201 2 2 2 2 2 <none> 4s
root@node-1:~# vim /opt/KUCC00108/pod-spec-KUCC00108.yaml
root@node-1:~# k create -f /opt/KUCC00108/pod-spec-KUCC00108.yaml
pod/hungry-bear created
root@node-1:~# k get po
NAME READY STATUS RESTARTS AGE
cpu-utilizer-98b9se 1/1 Running 0 5h50m
cpu-utilizer-ab2d3s 1/1 Running 0 5h50m
cpu-utilizer-kipb9a 1/1 Running 0 5h50m
ds-kusc00201-2r2k9 1/1 Running 0 4m50s
ds-kusc00201-hzm9q 1/1 Running 0 4m50s
foo 1/1 Running 0 5h52m
front-end 1/1 Running 0 5h52m
hungry-bear 1/1 Running 0 42s
webserver-84c55967f4-qzjcv 1/1 Running 0 6h7m
webserver-84c55967f4-t4791 1/1 Running 0 6h7m
root@node-1:~# k run nginx --image=nginx --dry-run=client -o yaml > nginx.yaml
root@node-1:~# vim nginx.yaml


Readme
Web Terminal
THE LINUX FOUNDATION
apiVersion: v1
kind: Pod
metadata:
name: kucc8
spec:
containers:
- image: nginx
name: nginx
- image: redis
name: redis
- image: memcached
name: memcached
:w



QUESTION NO: 13
List all persistent volumes sorted by capacity, saving the full kubectl output to /opt/KUCC00102/volume_list. Use kubectl 's own functionality for sorting the output, and do not manipulate it any further.

Answer:
solution



QUESTION NO: 14
Score: 4%

Task
Scale the deployment presentation to 6 pods.

Answer:
Solution:
kubectl get deployment
kubectl scale deployment.apps/presentation --replicas=6

QUESTION NO: 15
List "nginx-dev" and "nginx-prod" pod and delete those pods

Answer:
kubect1 get pods -o wide
kubectl delete po "nginx-dev" kubectl delete po "nginx-prod"

QUESTION NO: 16

Create a persistent volume with name app-data, of capacity 2Gi and access mode ReadWriteMany. The type of volume is hostPath and its location is /srv/app-data.

Answer:

solution

Persistent Volume

A persistent volume is a piece of storage in a Kubernetes cluster. PersistentVolumes are a cluster-level resource like nodes, which don't belong to any namespace. It is provisioned by the administrator and has a particular file size. This way, a developer deploying their app on Kubernetes need not know the underlying infrastructure. When the developer needs a certain amount of persistent storage for their application, the system administrator configures the cluster so that they consume the PersistentVolume provisioned in an easy way.

Creating Persistent Volume

kind: PersistentVolume apiVersion: v1 metadata: name:app-data spec: capacity: # defines the capacity of PV we are creating storage: 2Gi #the amount of storage we are tying to claim accessModes: # defines the rights of the volume we are creating - ReadWriteMany hostPath: path: "/srv/app-data" # path to which we are creating the volume Challenge Create a Persistent Volume named app-data, with access mode ReadWriteMany, storage classname shared, 2Gi of storage capacity and the host path /srv/app-data.

```
apiVersion: v1
kind: PersistentVolume
metadata:
  name: app-data
spec:
  capacity:
    storage: 2Gi
  accessModes:
    - ReadWriteMany
  hostPath:
      path: /srv/app-data
  storageClassName: shared
~
~
~
~
~
~
~
~
~
~
~
~
~
"app-data.yaml" 12L, 194C
```

2. Save the file and create the persistent volume.

```
njerry191@cloudshell:~ (extreme-clone-265411)$ kubectl create -f pv.yaml
persistentvolume/pv created
```

3. View the persistent volume.

```
njerry191@cloudshell:~ (extreme-clone-265411)$ kubectl get pv
NAME     CAPACITY   ACCESS MODES   RECLAIM POLICY   STATUS      CLAIM   STORAGECLASS   REASON   AGE
app-data 2Gi        RWX            Retain           Available           shared                  31s
```

Our persistent volume status is available meaning it is available and it has not been mounted yet. This status will change when we mount the persistentVolume to a persistentVolumeClaim.

PersistentVolumeClaim

In a real ecosystem, a system admin will create the PersistentVolume then a developer will create a PersistentVolumeClaim which will be referenced in a pod. A PersistentVolumeClaim is created by specifying the minimum size and the access mode they require from the persistentVolume.
Challenge
Create a Persistent Volume Claim that requests the Persistent Volume we had created above. The claim should request 2Gi. Ensure that the Persistent Volume Claim has the same storageClassName as the persistentVolume you had previously created.
kind: PersistentVolume apiVersion: v1 metadata: name:app-data
spec:
accessModes: - ReadWriteMany resources:
requests: storage: 2Gi
storageClassName: shared
2. Save and create the pvc
njerry191@cloudshell:~ (extreme-clone-2654111)$ kubect1 create -f app-data.yaml
persistentvolumeclaim/app-data created
3. View the pvc

```
njerry191@cloudshell:~ (extreme-clone-265411)$ kubectl get pvc
NAME    STATUS    VOLUME    CAPACITY    ACCESS MODES    STORAGECLASS
pv      Bound     pv        512m        RWX             shared
```

4. Let's see what has changed in the pv we had initially created.

```
njerry191@cloudshell:~ (extreme-clone-265411)$ kubectl get pv
NAME    CAPACITY    ACCESS MODES    RECLAIM POLICY    STATUS    CLAIM         STORAGECLASS    REASON    AGE
pv      512m        RWX             Retain            Bound     default/pv    shared          16m
```

Our status has now changed from available to bound.
5. Create a new pod named myapp with image nginx that will be used to Mount the Persistent Volume Claim with the path /var/app/config.
Mounting a Claim
apiVersion: v1 kind: Pod metadata: creationTimestamp: null name: app-data spec: volumes: - name:congigpvc persistenVolumeClaim: claimName: app-data containers: - image: nginx name: app volumeMounts: - mountPath: "/srv/app-data " name: configpvc

QUESTION NO: 17
Score: 5%

Task
Monitor the logs of pod bar and:
* Extract log lines corresponding to error file-not-found
* Write them to /opt/KUTR00101/bar

Answer:
Solution:
kubectl logs bar | grep 'unable-to-access-website' > /opt/KUTR00101/bar cat /opt/KUTR00101/bar

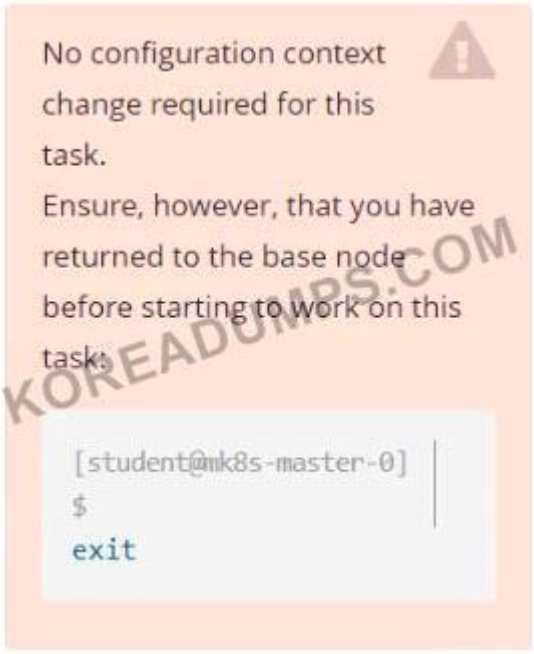
QUESTION NO: 18
Check the image version in pod without the describe command
Answer:
kubectl get po nginx -o
jsonpath='{.spec.containers[].image}{"\n"}'

QUESTION NO: 19
Print pod name and start time to "/opt/pod-status" file
Answer:
kubect1 get pods -o=jsonpath='{range
.items[*]}{.metadata.name}{"\t"}{.status.podIP}{"\n"}{end}'

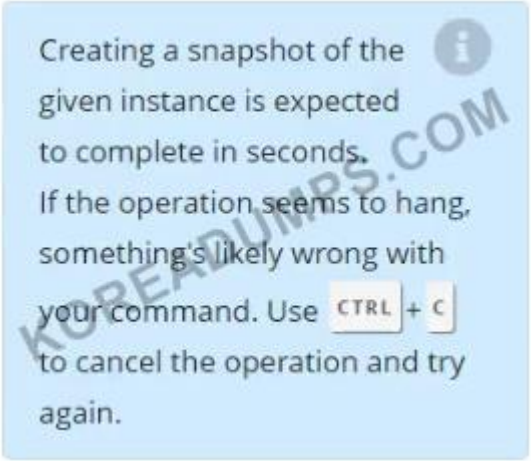
QUESTION NO: 20
Score: 5%

Task
From the pod label name=cpu-utilizer, find pods running high CPU workloads and write the name of the pod consuming most CPU to the file /opt/KUTR00401/KUTR00401.txt (which already exists).
Answer:
Solution:
kubectl top -l name=cpu-user -A
echo 'pod name' >> /opt/KUT00401/KUT00401.txt

QUESTION NO: 21
Score: 7%



Task
First, create a snapshot of the existing etcd instance running at https://127.0.0.1:2379, saving the snapshot to /srv/data/etcd-snapshot.db.



Next, restore an existing, previous snapshot located at /var/lib/backup/etcd-snapshot-previous.db

Answer:

Solution:

#backup

ETCDCTL_API=3 etcdctl --endpoints="https://127.0.0.1:2379" --cacert=/opt/KUIN000601/ca.crt --cert=/opt/KUIN000601/etcd-client.crt --key=/opt/KUIN000601/etcd-client.key snapshot save /etc/data/etcd-snapshot.db

#restore

ETCDCTL_API=3 etcdctl --endpoints="https://127.0.0.1:2379" --cacert=/opt/KUIN000601/ca.crt --cert=/opt/KUIN000601/etcd-client.crt --key=/opt/KUIN000601/etcd-client.key snapshot restore /var/lib/backup/etcd-snapshot-previoys.db

QUESTION NO: 22

Create a snapshot of the etcd instance running at https://127.0.0.1:2379, saving the snapshot to the file path /srv/data/etcd-snapshot.db.

The following TLS certificates/key are supplied for connecting to the server with etcdctl:

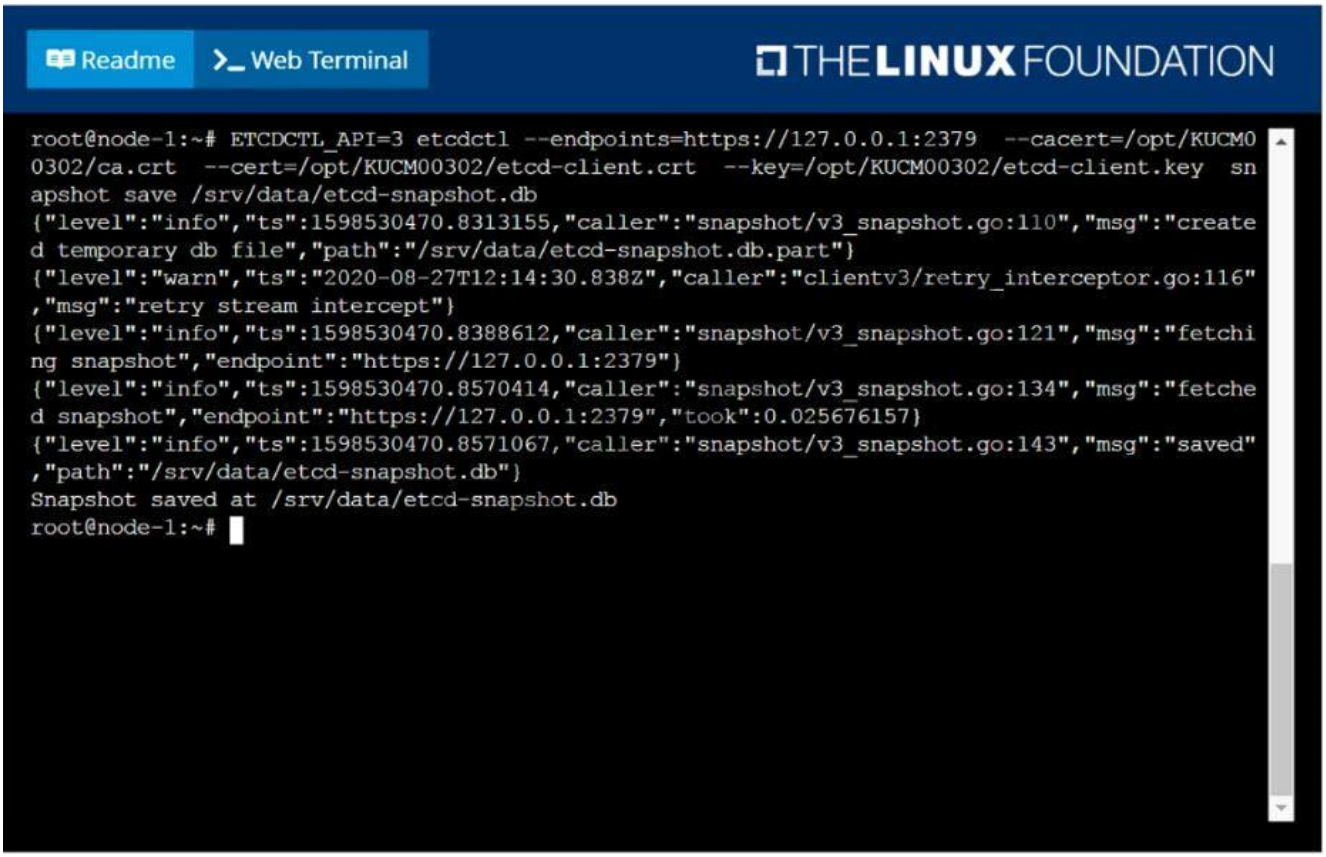
CA certificate: /opt/KUCM00302/ca.crt

Client certificate: /opt/KUCM00302/etcd-client.crt

Client key: Topt/KUCM00302/etcd-client.key

Answer:

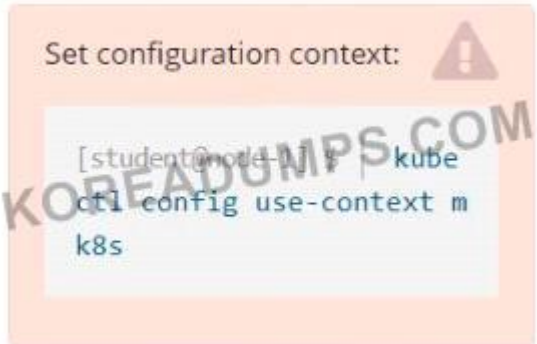
solution



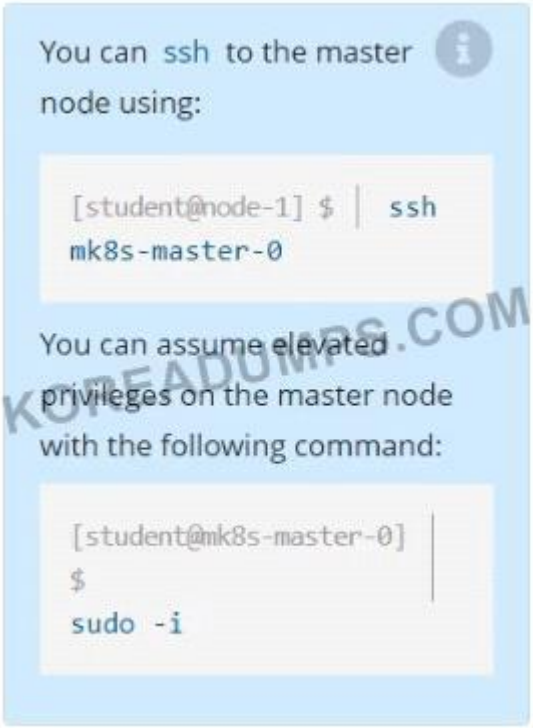
QUESTION NO: 23
Get IP address of the pod - "nginx-dev"
Answer:
Kubect1 get po -o wide
Using JsonPath
kubect1 get pods -o=jsonpath='{range
.items[*]}{.metadata.name}{"\t"}{.status.podIP}{"\n"}{end}'

QUESTION NO: 24
List all the pods sorted by name
Answer:
kubect1 get pods --sort-by=.metadata.name

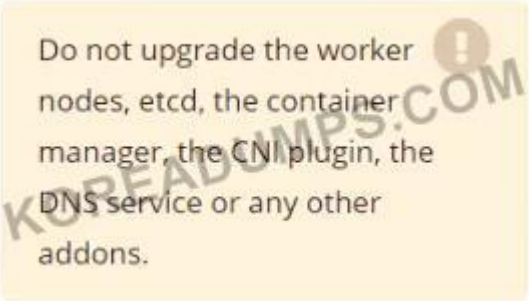
QUESTION NO: 25
Score: 7%



Task
Given an existing Kubernetes cluster running version 1.20.0, upgrade all of the Kubernetes control plane and node components on the master node only to version 1.20.1.
Be sure to drain the master node before upgrading it and uncordon it after the upgrade.



You are also expected to upgrade kubelet and kubectl on the master node.



Answer:
SOLUTION:
[student@node-1] > ssh ek8s
kubectl cordon k8s-master
kubectl drain k8s-master --delete-local-data --ignore-daemonsets --force apt-get install kubeadm=1.20.1-00 kubelet=1.20.1-00 kubectl=1.20.1-00 --disableexcludes=kubernetes kubeadm upgrade apply 1.20.1 --etcd-upgrade=false systemctl daemon-reload systemctl restart kubelet kubectl uncordon k8s-master

QUESTION NO: 26
List the nginx pod with custom columns POD_NAME and POD_STATUS
Answer:
kubectl get po -o=custom-columns="POD_NAME:.metadata.name, POD_STATUS:.status.containerStatuses[].state"

QUESTION NO: 27
List all the pods sorted by created timestamp
Answer:
kubect1 get pods--sort-by=.metadata.creationTimestamp

QUESTION NO: 28
Score: 4%

Task
Check to see how many nodes are ready (not including nodes tainted NoSchedule) and write the number to /opt/KUSC00402/kusc00402.txt.
Answer:
Solution:
kubectl describe nodes | grep ready|wc -l
kubectl describe nodes | grep -i taint | grep -i noschedule |wc -l
echo 3 > /opt/KUSC00402/kusc00402.txt
#
kubectl get node | grep -i ready |wc -l
taints、noSchedule
kubectl describe nodes | grep -i taints | grep -i noschedule |wc -l
#
echo 2 > /opt/KUSC00402/kusc00402.txt

QUESTION NO: 29
Get list of all pods in all namespaces and write it to file "/opt/pods-list.yaml"
Answer:
kubectl get po -all-namespaces > /opt/pods-list.yaml

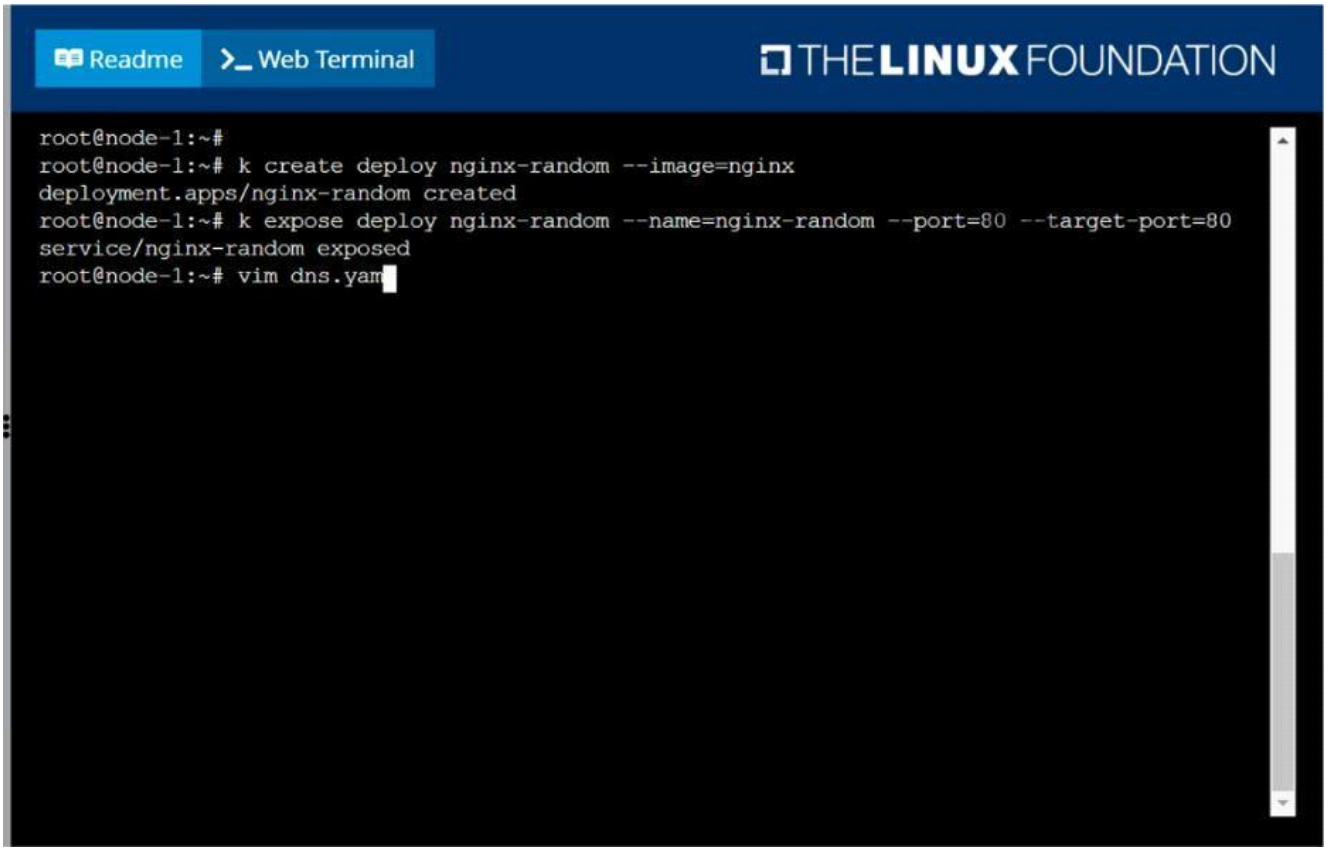
QUESTION NO: 30
Score: 7%

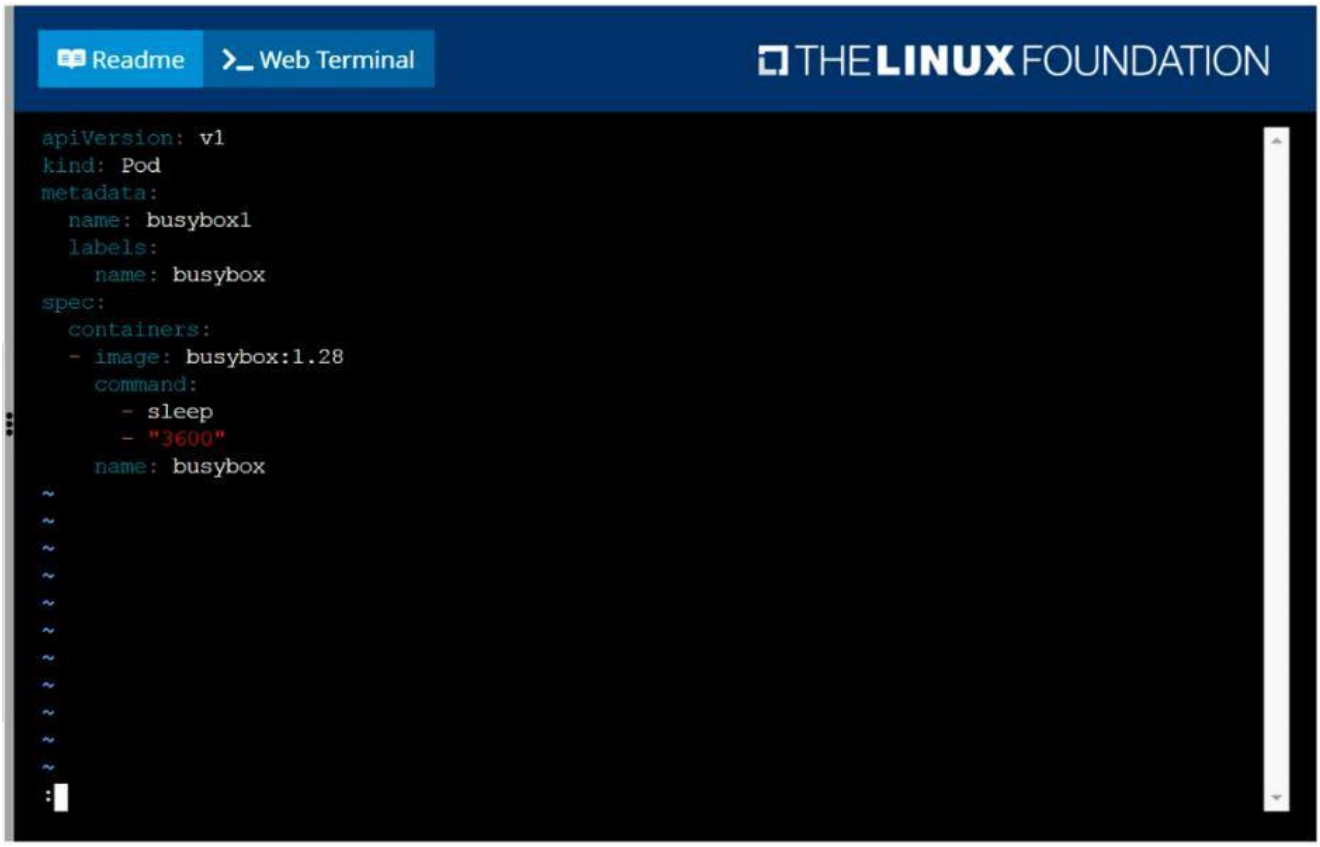
Task
Create a new nginx Ingress resource as follows:
* Name: ping
* Namespace: ing-internal
* Exposing service hi on path /hi using service port 5678

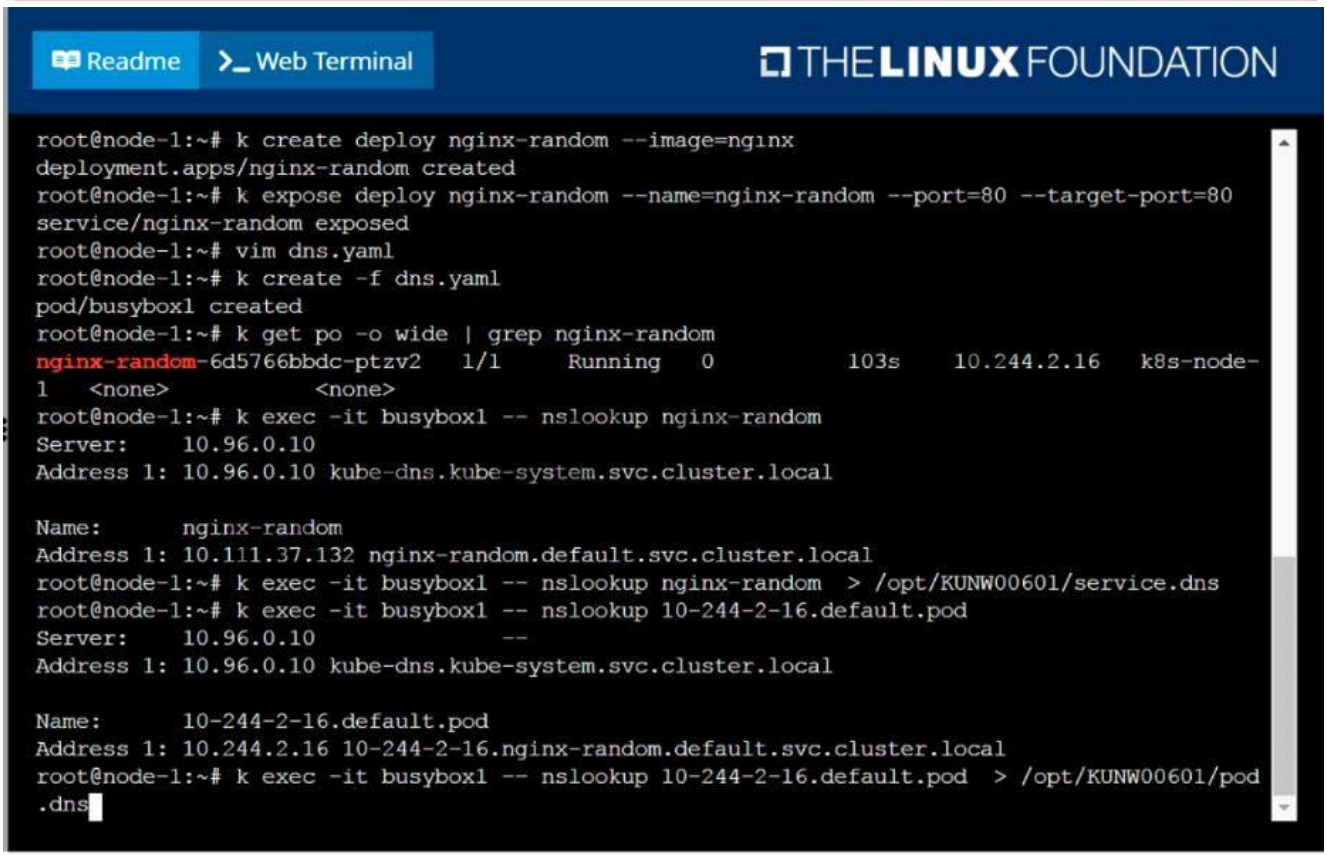
Answer:
Solution:
vi ingress.yaml
#
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
name: ping
namespace: ing-internal
spec:
rules:
- http:
paths:
- path: /hi
pathType: Prefix
backend:
service:
name: hi
port:
number: 5678

#
kubectl create -f ingress.yaml

QUESTION NO: 31
Create a deployment as follows:
Name: nginx-random
Exposed via a service nginx-random
Ensure that the service & pod are accessible via their respective DNS records The container(s) within any pod(s) running as a part of this deployment should use the nginx Image Next, use the utility nslookup to look up the DNS records of the service & pod and write the output to /opt/KUNW00601/service.dns and /opt/KUNW00601/pod.dns respectively.
Answer:
Solution:







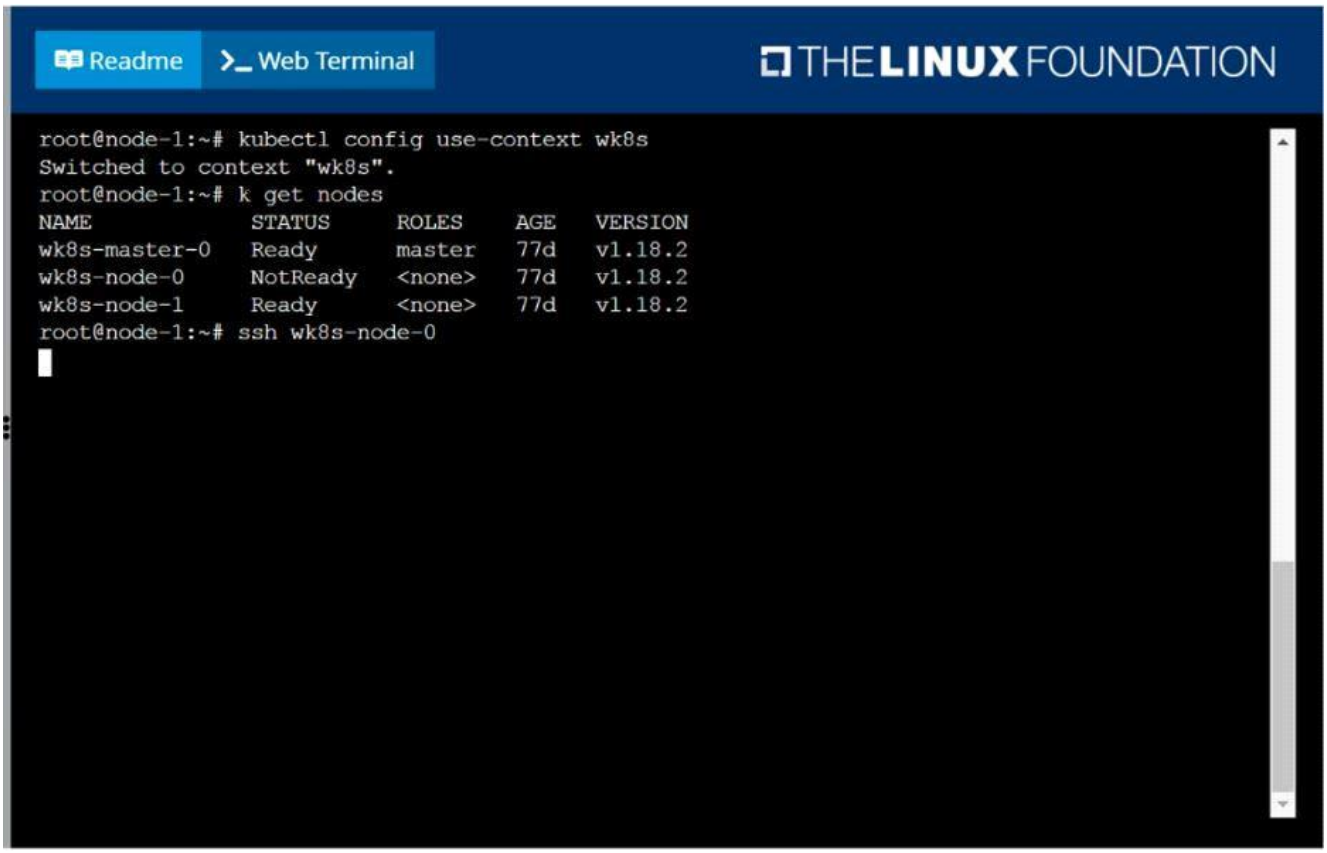
QUESTION NO: 32

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.

You can ssh to the failed node using:
[student@node-1] $ | ssh Wk8s-node-0
You can assume elevated privileges on the node with the following command:
[student@w8ks-node-0] $ | sudo -i

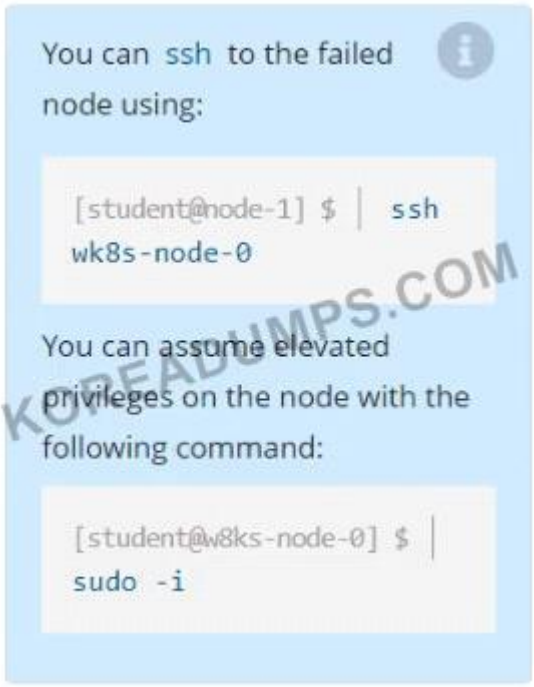
Answer:

solution



QUESTION NO: 33
Score: 13%

Task
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.



Answer:
Solution:
sudo -i
systemctl status kubelet
systemctl start kubelet
systemctl enable kubelet

QUESTION NO: 34
Get list of all the pods showing name and namespace with a jsonpath expression.
Answer:
kubectl get pods -o=jsonpath="{.items[*]['metadata.name'
, 'metadata.namespace']}"

QUESTION NO: 35
Score: 4%

Task
Set the node named ek8s-node-1 as unavailable and reschedule all the pods running on it.

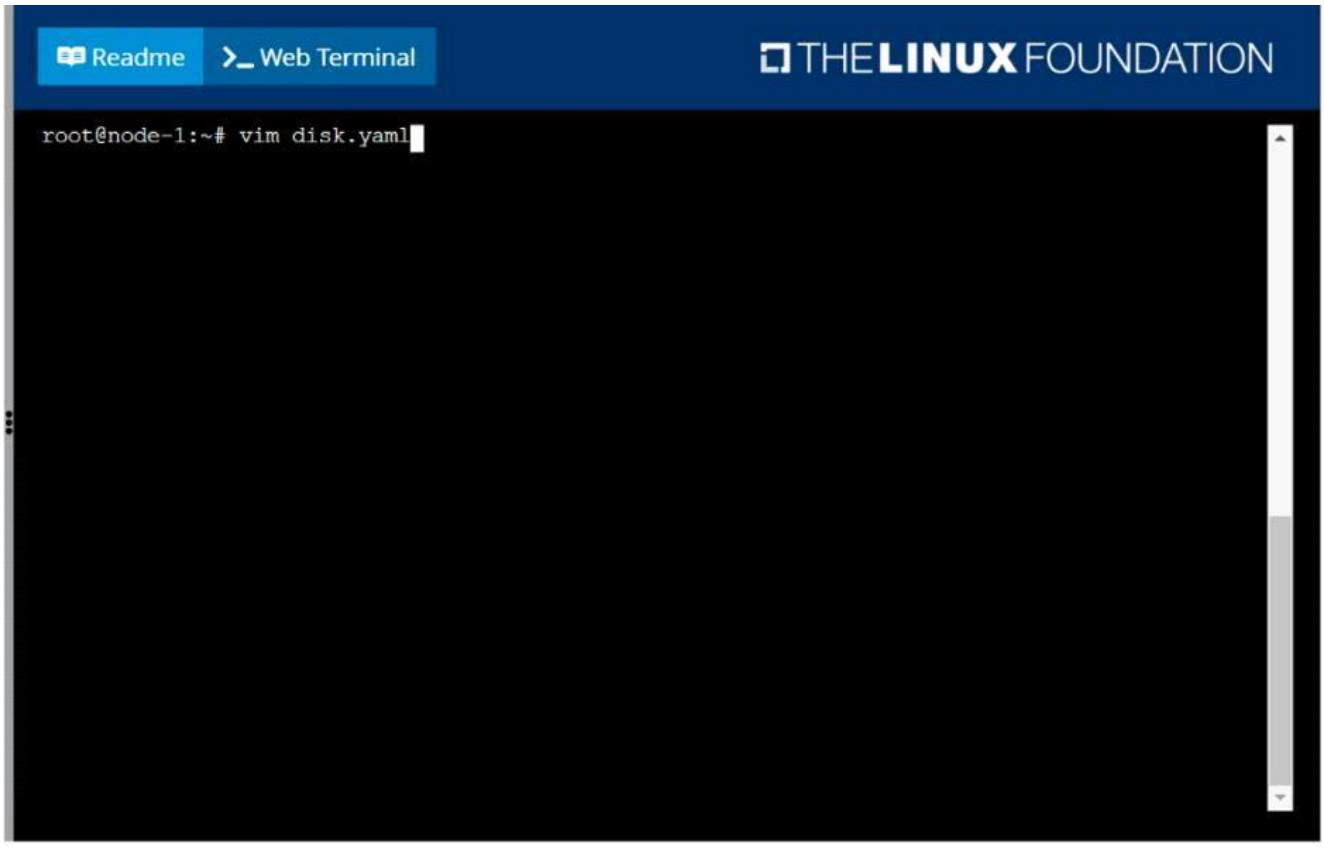
Answer:

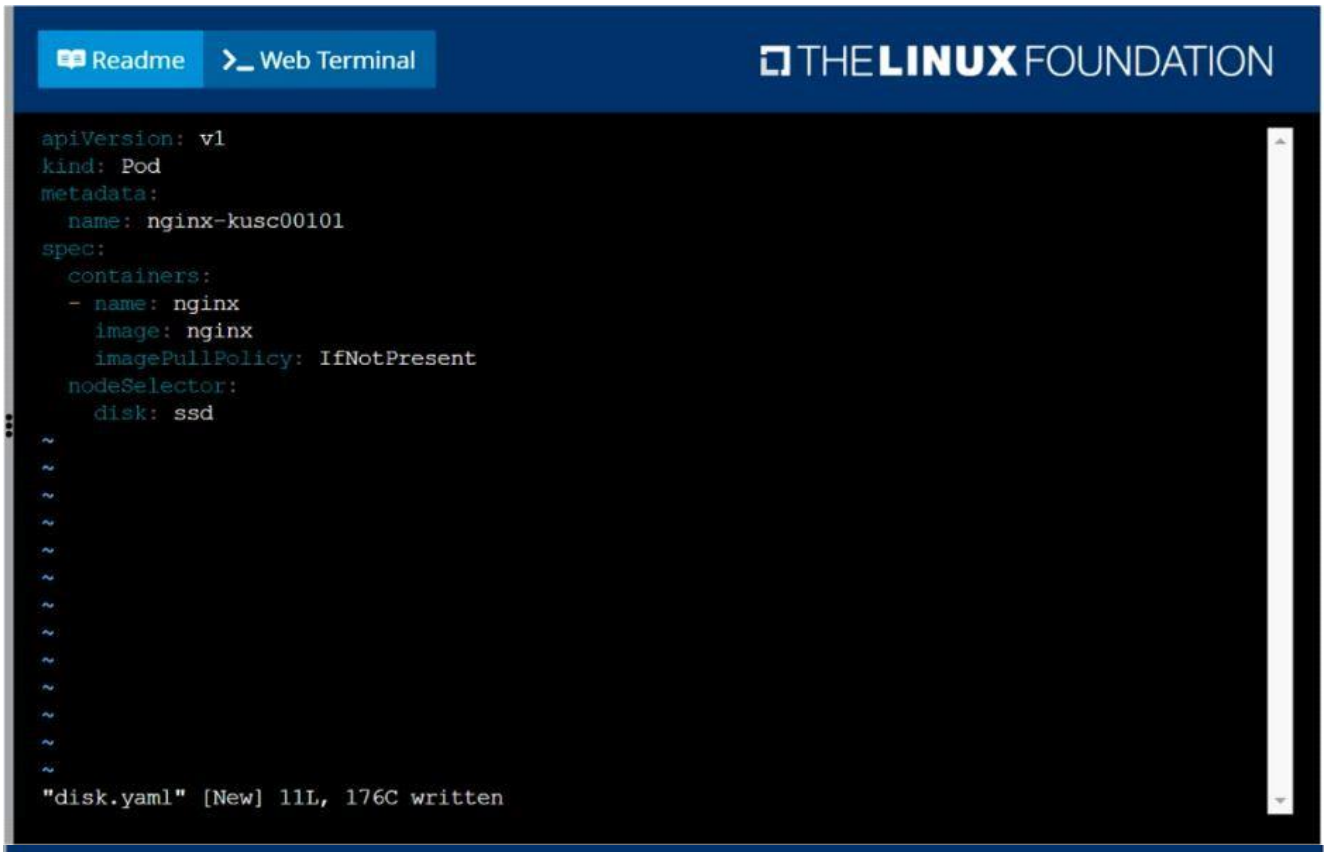
SOLUTION:
[student@node-1] > ssh ek8s
kubectl cordon ek8s-node-1
kubectl drain ek8s-node-1 --delete-local-data --ignore-daemonsets --force

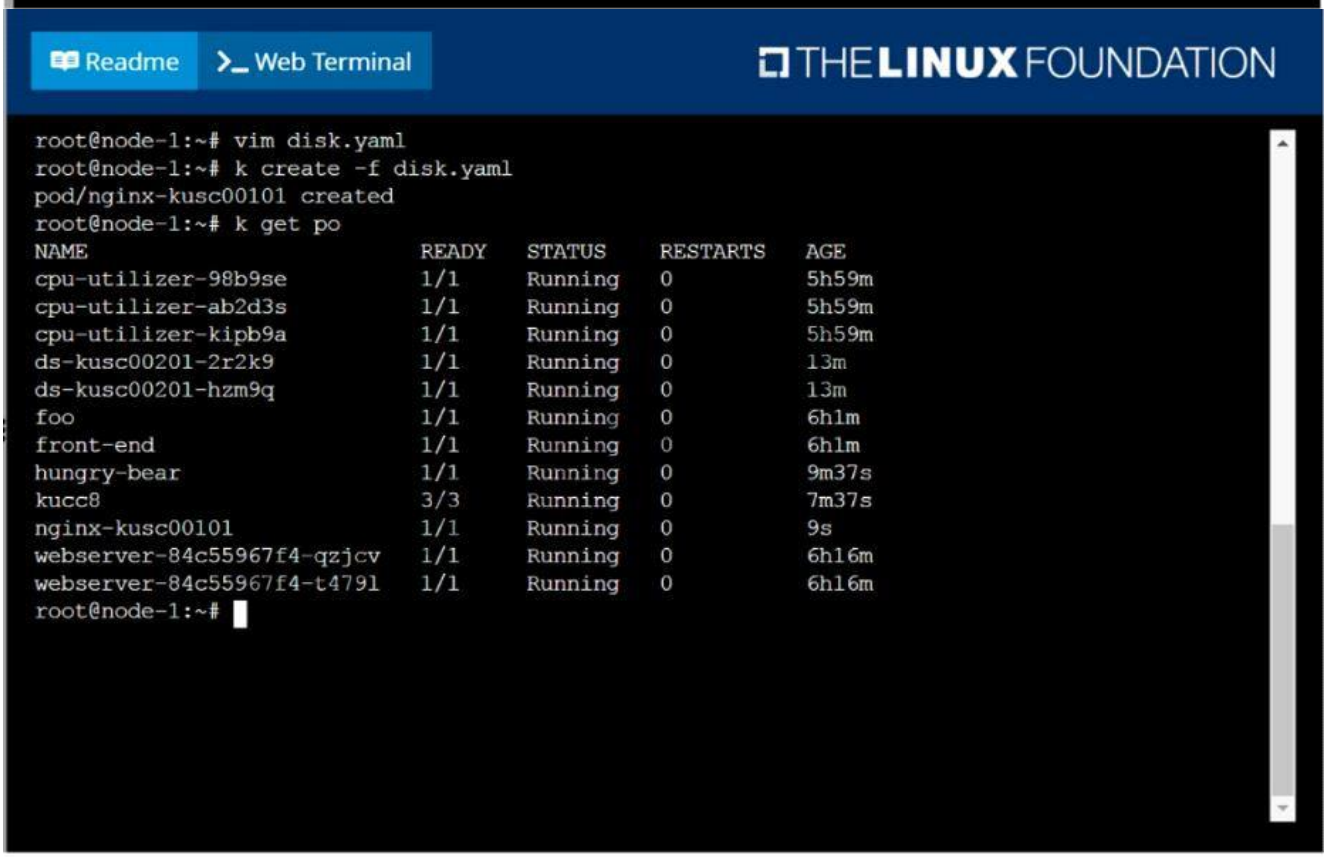
QUESTION NO: 36
Schedule a pod as follows:
Name: nginx-kusc00101
Image: nginx
Node selector: disk=ssd

Answer:

solution







QUESTION NO: 37
Score: 4%

Context
You have been asked to create a new ClusterRole for a deployment pipeline and bind it to a specific ServiceAccount scoped to a specific namespace.
Task
Create a new ClusterRole named deployment-clusterrole, which only allows to create the following resource types:
* Deployment
* StatefulSet
* DaemonSet
Create a new ServiceAccount named cicd-token in the existing namespace app-team1.
Bind the new ClusterRole deployment-clusterrole lo the new ServiceAccount cicd-token , limited to the namespace app-team1.

Answer:

Solution:
Task should be complete on node k8s -1 master, 2 worker for this connect use command
[student@node-1] > ssh k8s
kubectl create clusterrole deployment-clusterrole --verb=create --resource=deployments,statefulsets,daemonsets kubectl create serviceaccount cicd-token --namespace=app-team1 kubectl create rolebinding deployment-clusterrole --clusterrole=deployment-clusterrole --serviceaccount=default:cicd-token --namespace=app-team1

QUESTION NO: 38
Create a busybox pod and add "sleep 3600" command

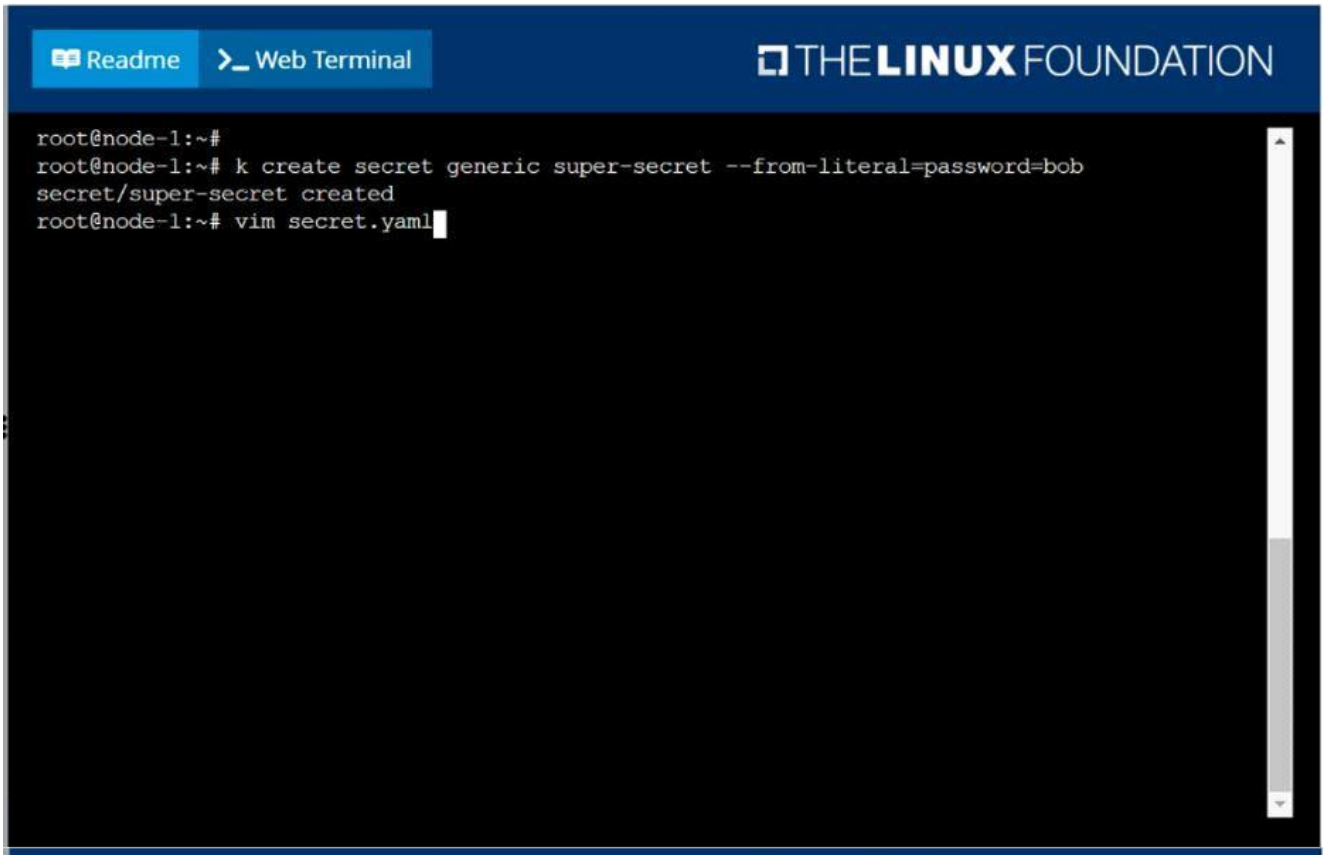
Answer:

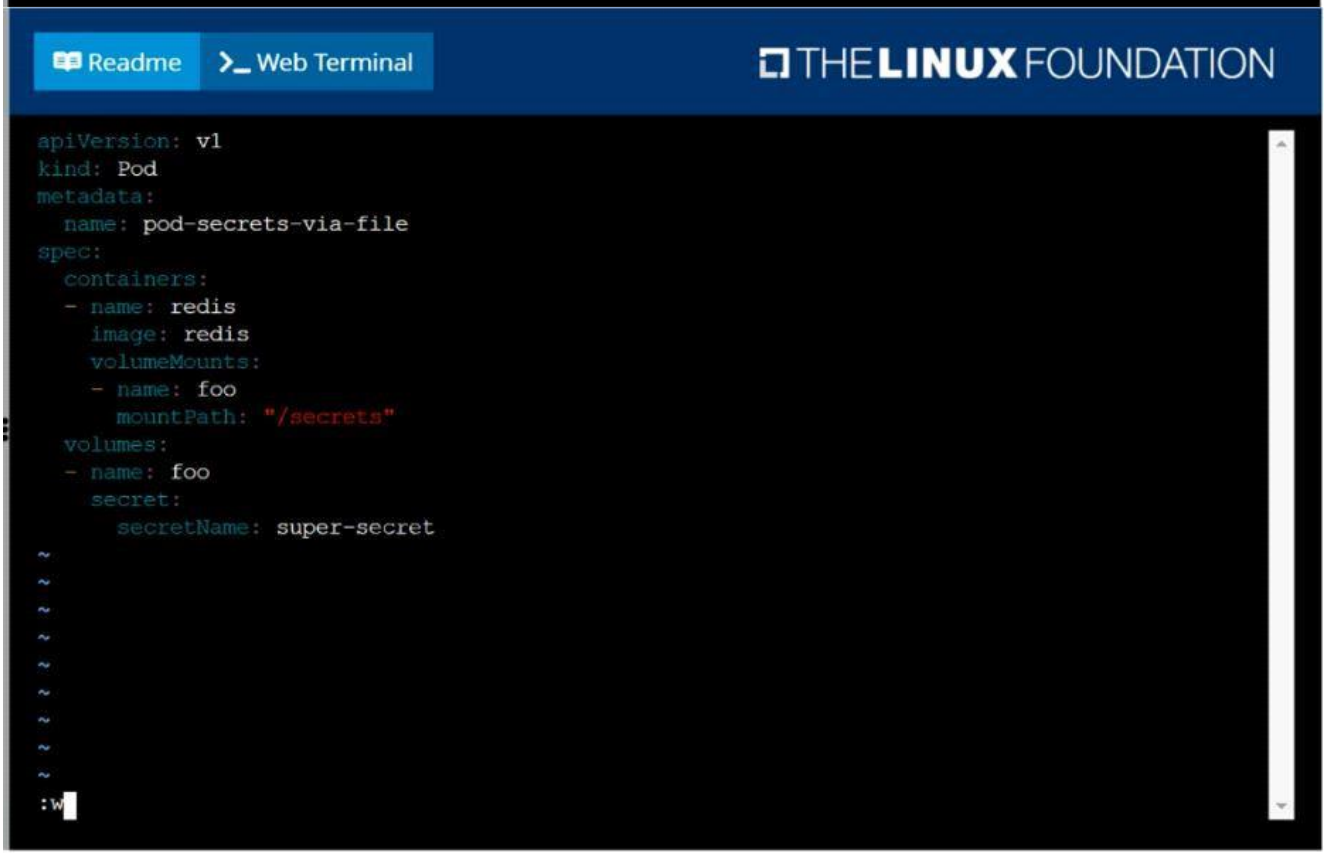
kubectl run busybox --image=busybox --restart=Never -- /bin/sh -c
"sleep 3600"

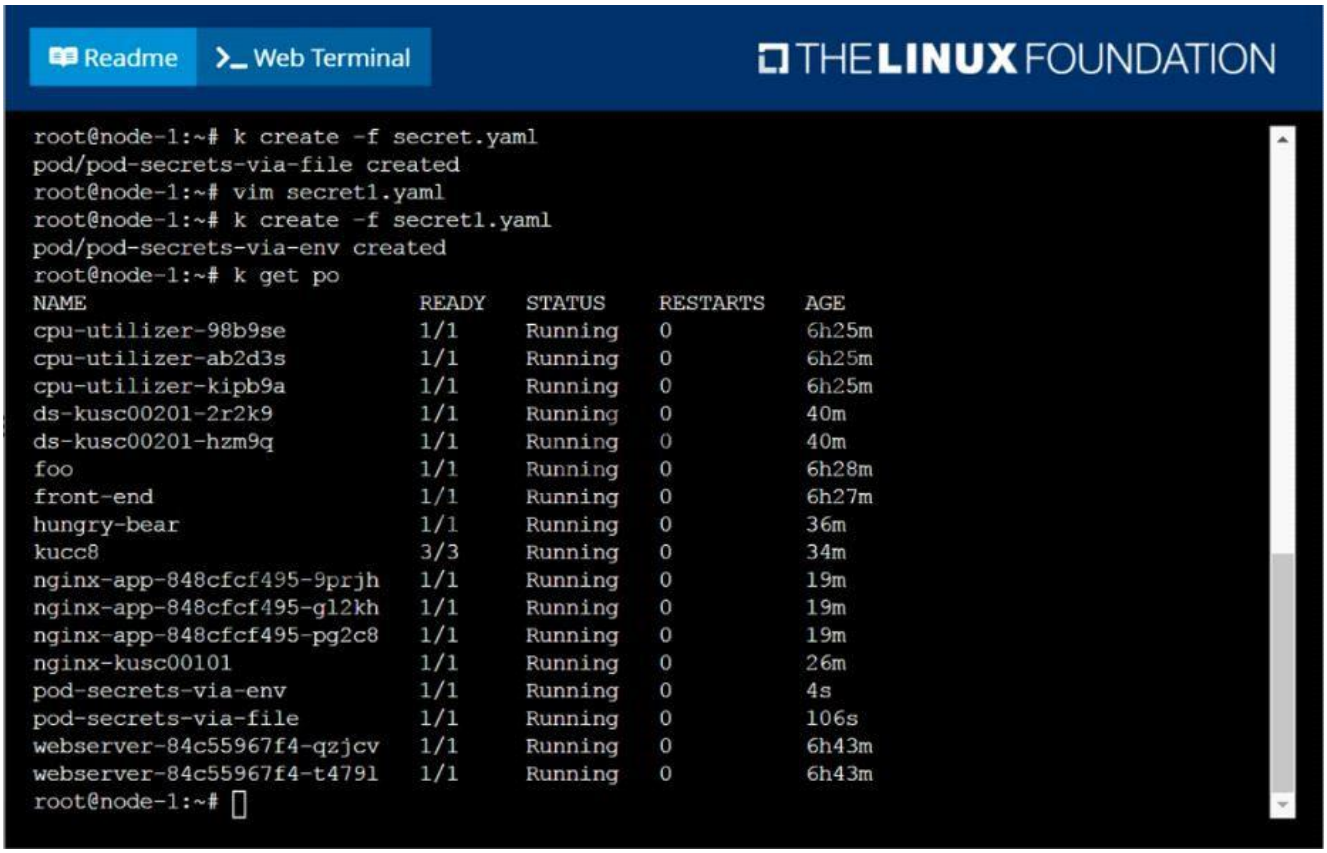
QUESTION NO: 39
Create a Kubernetes secret as follows:
Name: super-secret
password: bob
Create a pod named pod-secrets-via-file, using the redis Image, which mounts a secret named super-secret at /secrets.
Create a second pod named pod-secrets-via-env, using the redis Image, which exports password as CONFIDENTIAL

Answer:

solution







QUESTION NO: 40
Perform the following tasks:
Add an init container to hungry-bear (which has been defined in spec file /opt/KUCC00108/pod-spec-KUC C00108.yaml) The init container should create an empty file named /workdir/calm.txt If /workdir/calm.txt is not detected, the pod should exit Once the spec file has been updated with the init container definition, the pod should be created

Answer:
solution

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```
root@node-1:~# vim ds.yaml
iroot@node-1:~# k create -f ds.yaml
daemonset.apps/ds-kusc00201 created
root@node-1:~# k get ds
NAME           DESIRED   CURRENT   READY   UP-TO-DATE   AVAILABLE   NODE SELECTOR   AGE
ds-kusc00201   2         2         2       2            2           <none>          4s
root@node-1:~# vim /opt/KUCC00108/pod-spec-KUCC00108.yaml
```

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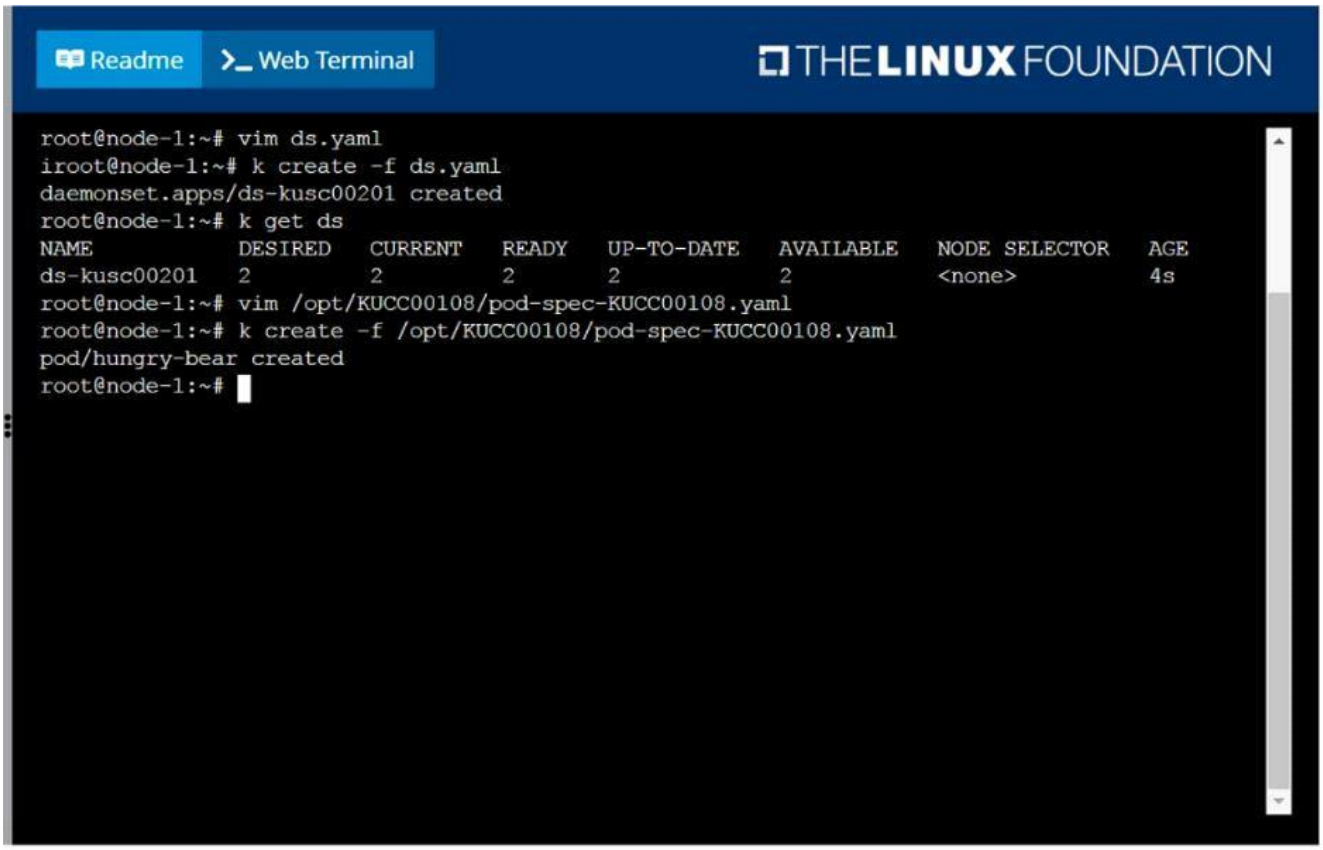
```
apiVersion: v1
kind: Pod
metadata:
  name: hungry-bear
spec:
  volumes:
    - name: workdir
      emptyDir:
  containers:
  - name: checker
    image: alpine
    command: ["/bin/sh", "-c", "if [ -f /workdir/calm.txt ];
              then sleep 100000; else exit 1; fi"]
    volumeMounts:
    - name: workdir
      mountPath: /workdir
  initContainers:
  - name: create
    image: alpine
    command: ["/bin/sh", "-c", "touch /workdir/calm.txt"]
    volumeMounts:
    - name: workdir
      mountPath: /workdir
:wq
```

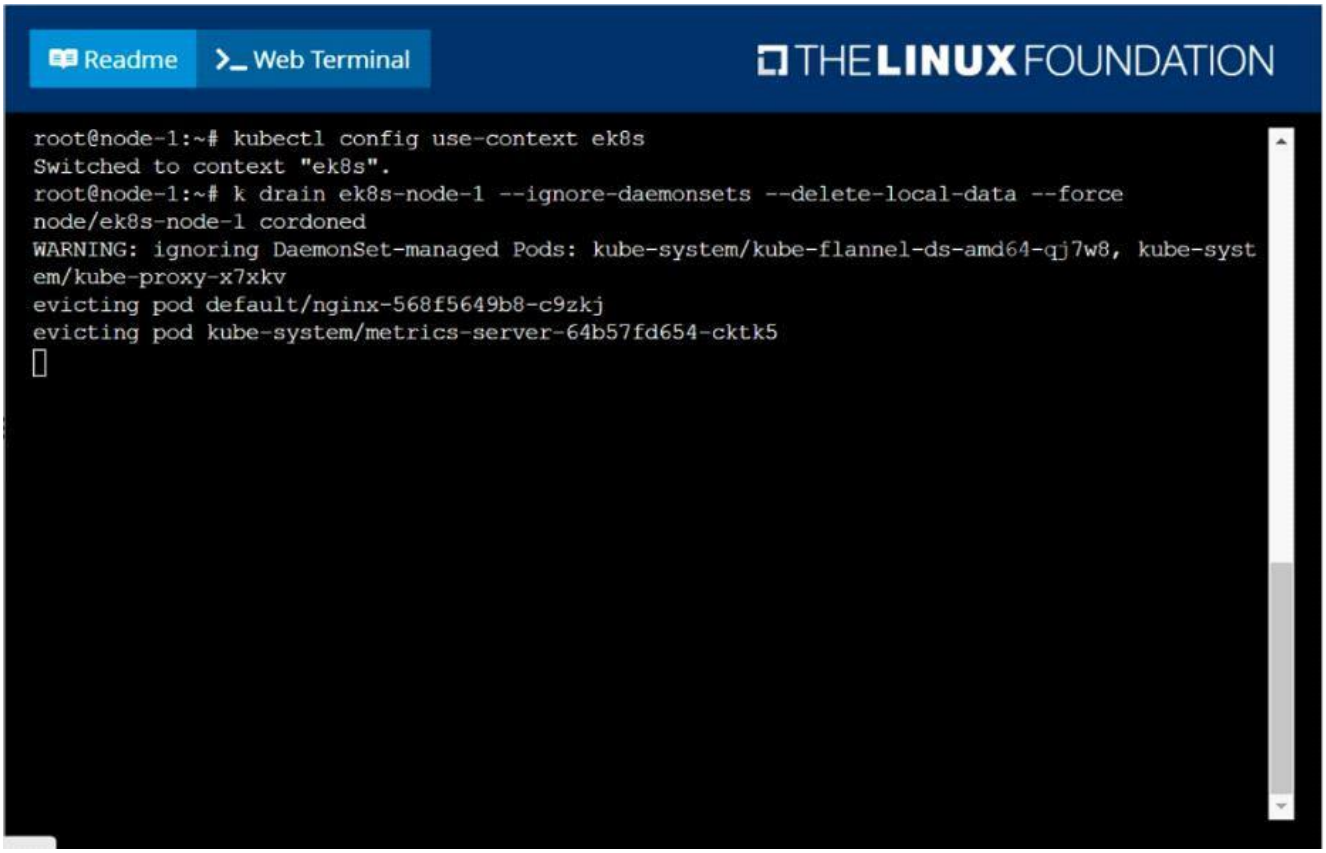


QUESTION NO: 41
List all the pods sorted by name
Answer:
kubectl get pods --sort-by=.metadata.name

QUESTION NO: 42
Create a nginx pod with label env=test in engineering namespace
Answer:
kubectl run nginx --image=nginx --restart=Never --labels=env=test --namespace=engineering --dry-run -o yaml > nginx-pod.yaml kubectl run nginx --image=nginx --restart=Never --labels=env=test --namespace=engineering --dry-run -o yaml | kubectl create -n engineering -f - YAML File:
apiVersion: v1
kind: Pod
metadata:
name: nginx
namespace: engineering
labels:
env: test
spec:
containers:
- name: nginx
image: nginx
imagePullPolicy: IfNotPresent

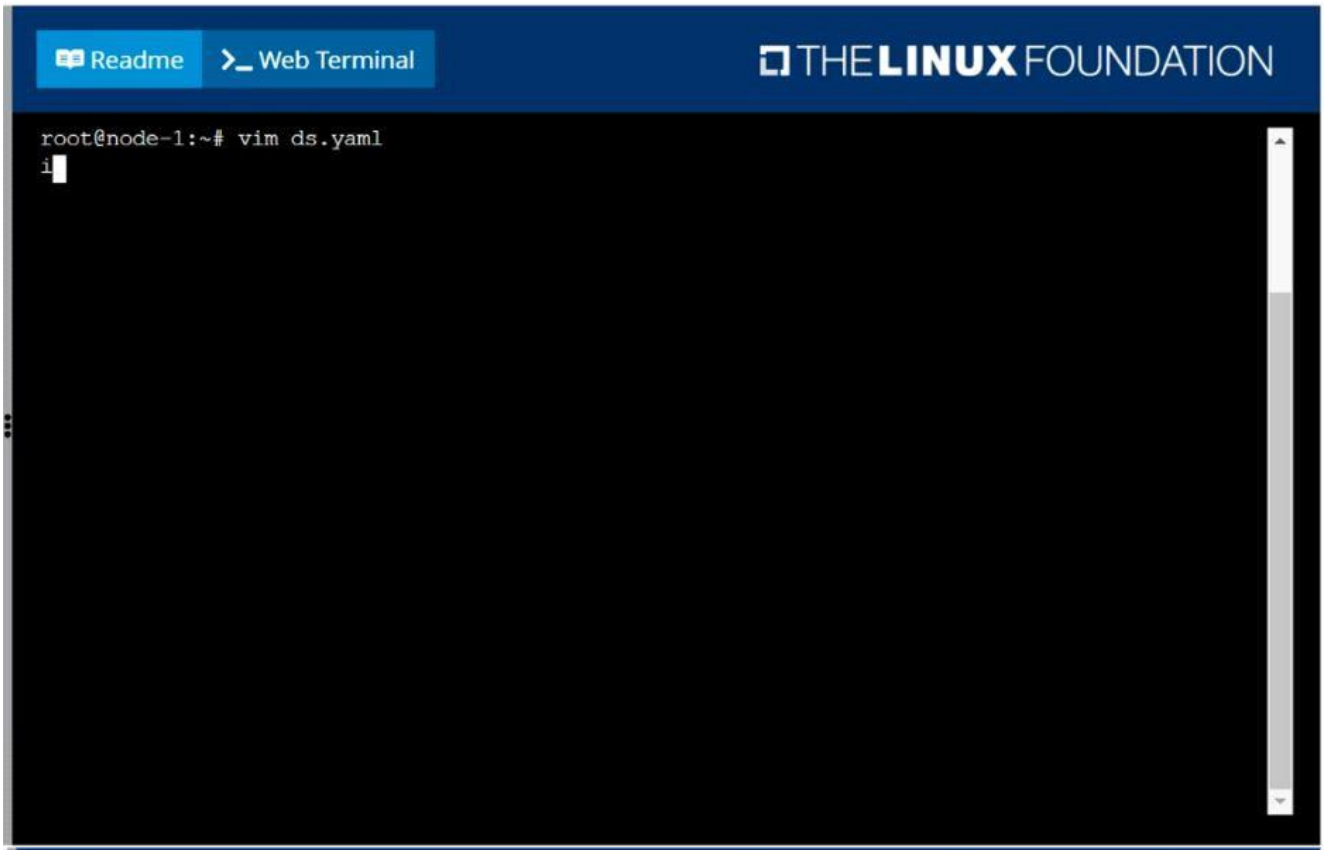
restartPolicy: Never
kubectl create -f nginx-pod.yaml

QUESTION NO: 43
Set the node named ek8s-node-1 as unavailable and reschedule all the pods running on it.
Answer:
solution



QUESTION NO: 44
Check the Image version of nginx-dev pod using jsonpath
Answer:
kubect1 get po nginx-dev -o
jsonpath='{.spec.containers[].image}{"\n"}'

QUESTION NO: 45
Ensure a single instance of pod nginx is running on each node of the Kubernetes cluster where nginx also represents the Image name which has to be used. Do not override any taints currently in place.
Use DaemonSet to complete this task and use ds-kusc00201 as DaemonSet name.
Answer:
solution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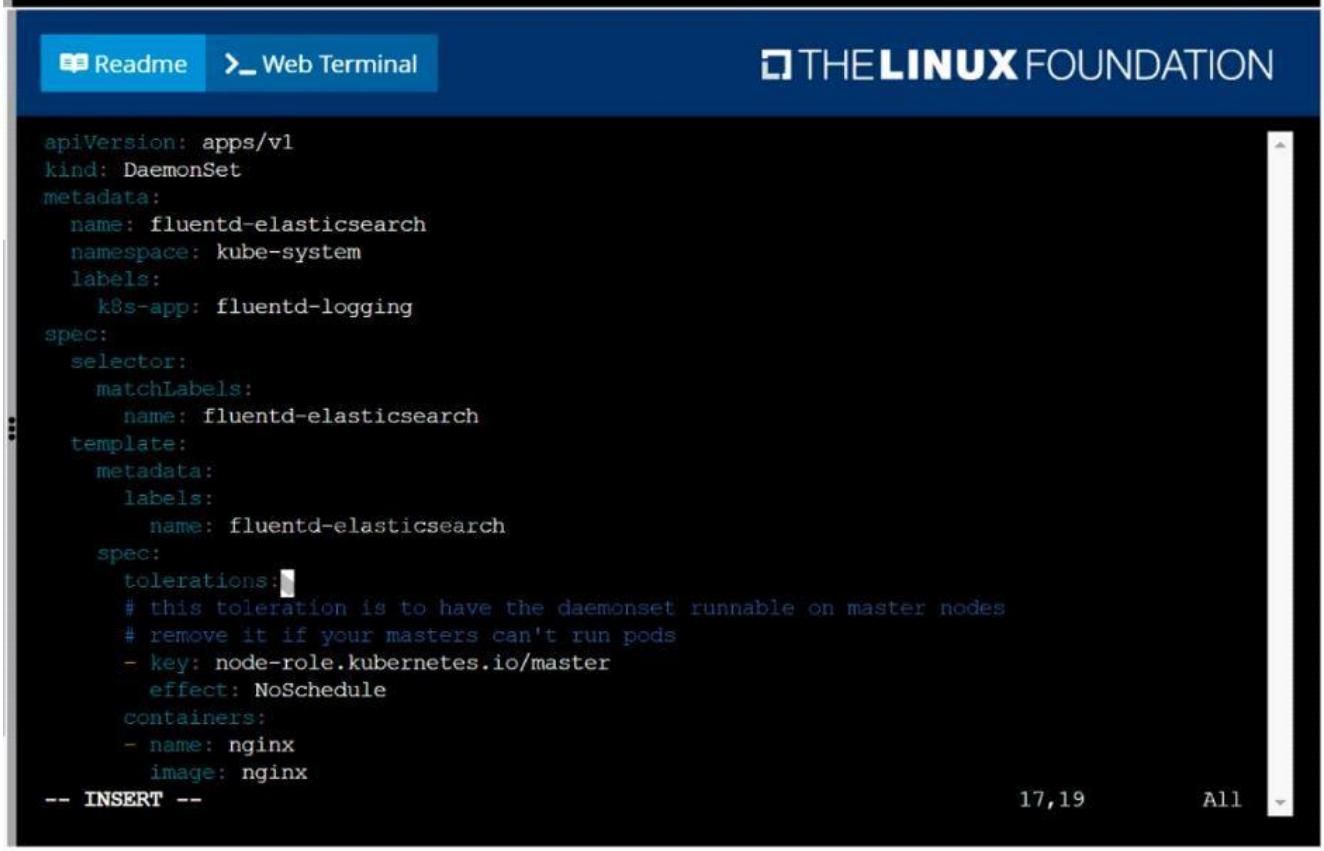
root@node-1:~# vim ds.yaml
i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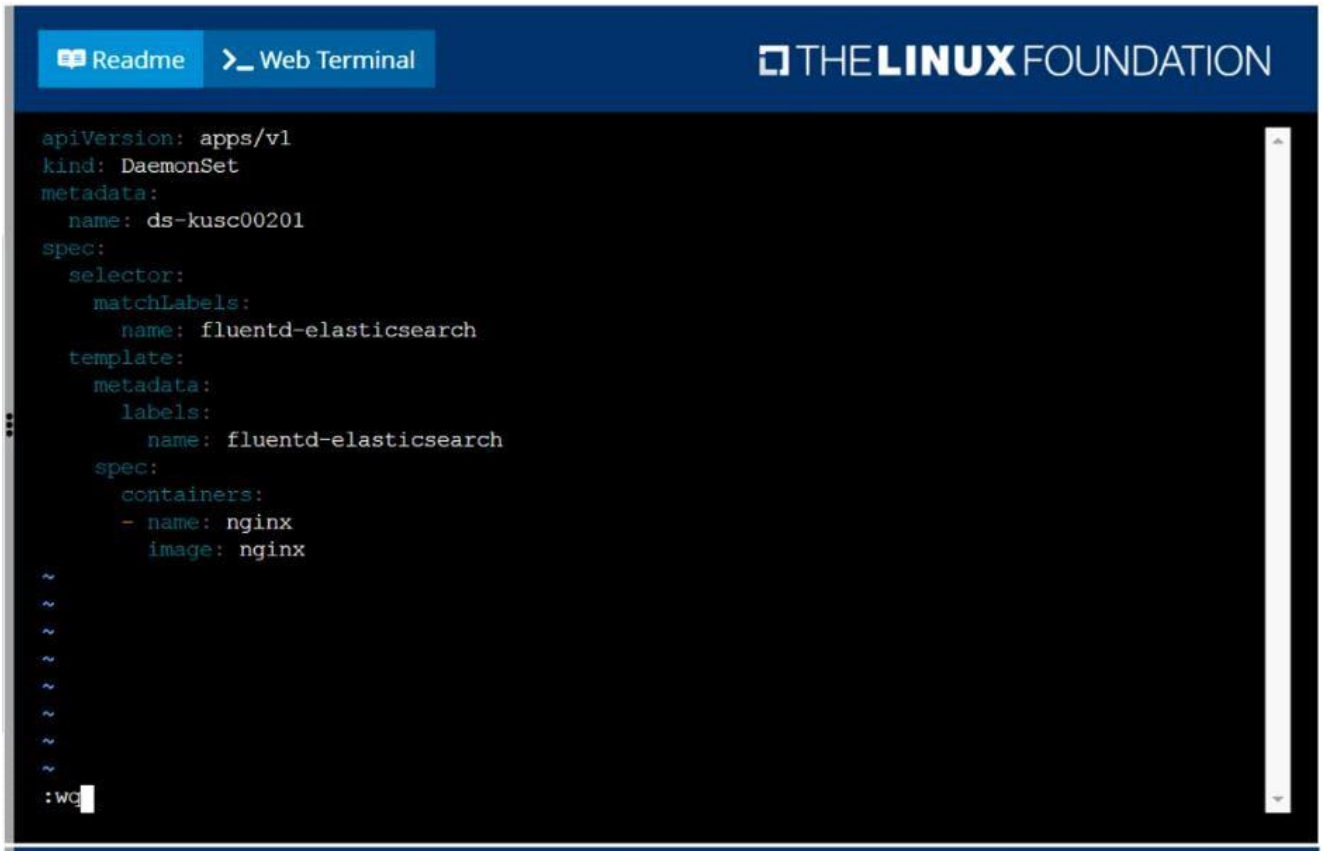
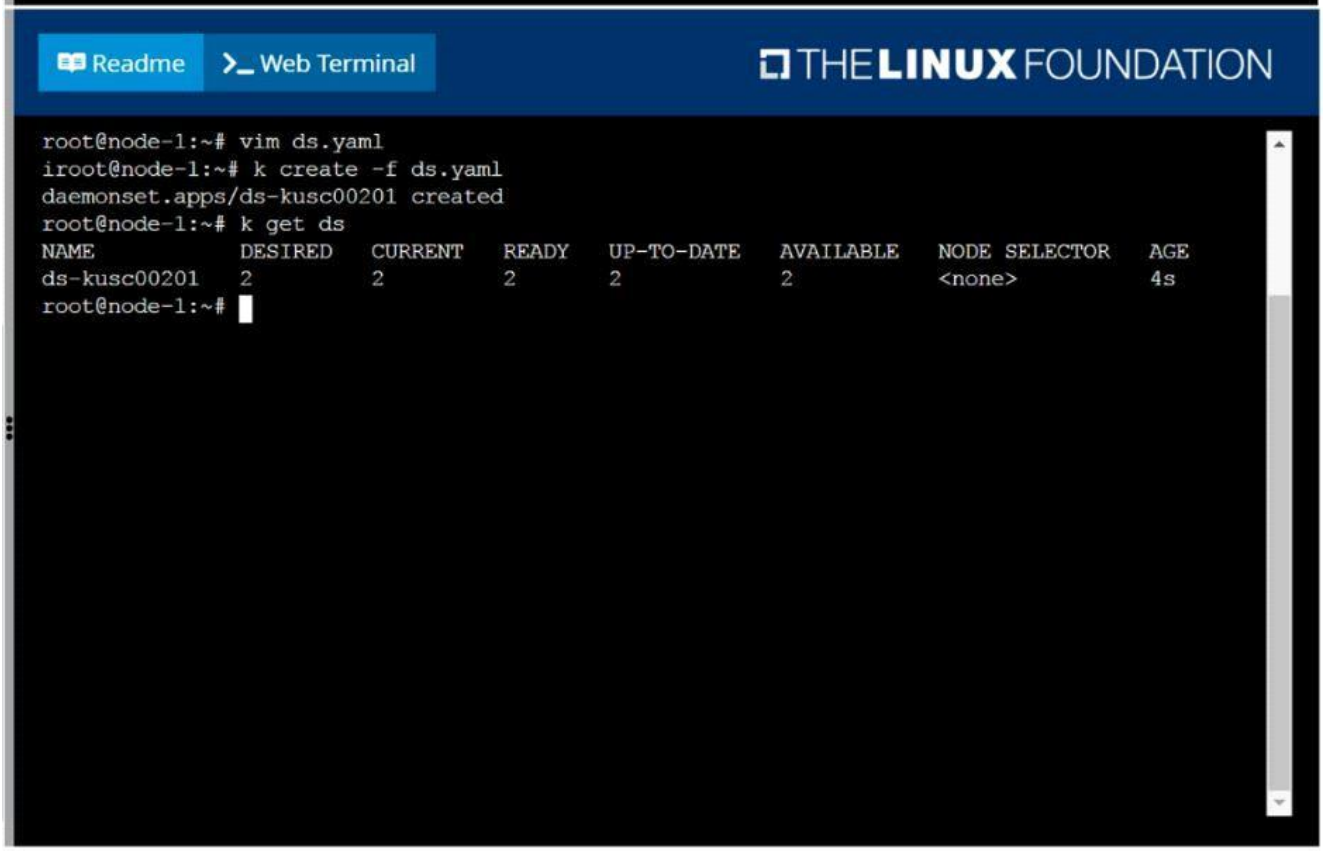
apiVersion: apps/v1
kind: DaemonSet
metadata:
name: fluentd-elasticsearch
namespace: kube-system
labels:
k8s-app: fluentd-logging
spec:
selector:
matchLabels:
name: fluentd-elasticsearch
template:
metadata:
labels:
name: fluentd-elasticsearch
spec:
tolerations:
this toleration is to have the daemonset runnable on master nodes
remove it if your masters can't run pods
- key: node-role.kubernetes.io/master
effect: NoSchedule
containers:
- name: nginx
image: nginx
-- INSERT --
17,19
All





QUESTION NO: 46
Score: 7%

Task
Create a new NetworkPolicy named allow-port-from-namespace in the existing namespace echo. Ensure that the new NetworkPolicy allows Pods in namespace my-app to connect to port 9000 of Pods in namespace echo.
Further ensure that the new NetworkPolicy:
* does not allow access to Pods, which don't listen on port 9000
* does not allow access from Pods, which are not in namespace my-app

Answer:
Solution:
#network.yaml
apiVersion: networking.k8s.io/v1
kind: NetworkPolicy
metadata:
name: allow-port-from-namespace
namespace: internal
spec:
podSelector:
matchLabels: {
}
policyTypes:
- Ingress
ingress:
- from:
- podSelector: {
}
ports:
- protocol: TCP
port: 8080
#spec.podSelector namespace pod
kubectl create -f network.yaml

QUESTION NO: 47
Score: 4%

Task
Schedule a pod as follows:
* Name: nginx-kusc00401
* Image: nginx
* Node selector: disk=ssd

Answer:

Solution:
#yaml
apiVersion: v1
kind: Pod
metadata:
name: nginx-kusc00401
spec:
containers:
- name: nginx
image: nginx
imagePullPolicy: IfNotPresent
nodeSelector:
disk: spinning
#
kubectl create -f node-select.yaml

QUESTION NO: 48
Create a busybox pod that runs the command "env" and save the output to "envpod" file

Answer:

kubectl run busybox --image=busybox --restart=Never --rm -it -- env > envpod.yaml

QUESTION NO: 49
Score: 4%

Task
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
.

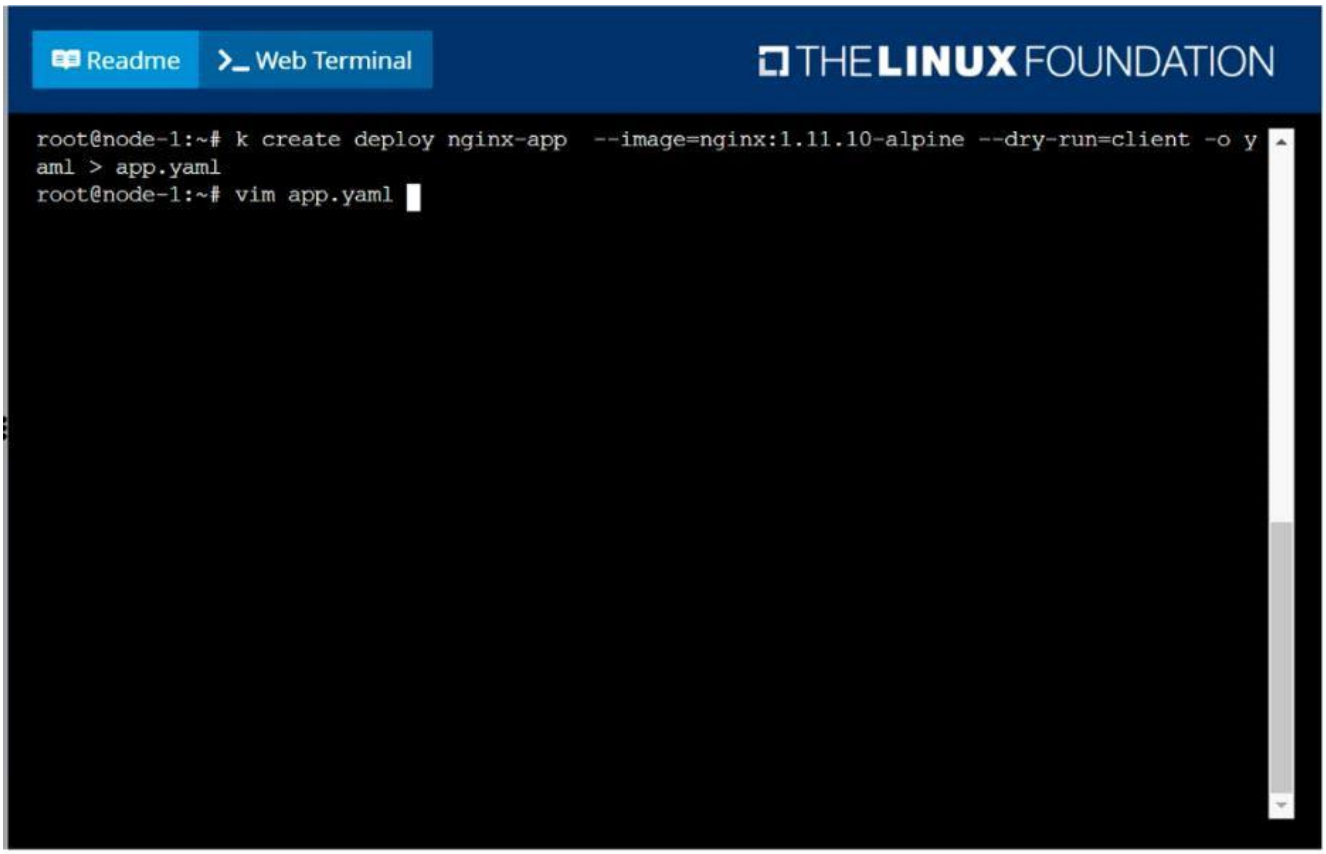
Answer:

Solution:
kubectl run kucc8 --image=nginx --dry-run -o yaml > kucc8.yaml
vi kucc8.yaml
apiVersion: v1
kind: Pod
metadata:
creationTimestamp: null
name: kucc8
spec:
containers:
- image: nginx
name: nginx
- image: redis
name: redis
- image: memcached
name: memcached
- image: consul
name: consul
#
kubectl create -f kucc8.yaml
#12.07

QUESTION NO: 50
Create a deployment as follows:
Name: nginx-app
Using container nginx with version 1.11.10-alpine
The deployment should contain 3 replicas
Next, deploy the application with new version 1.11.13-alpine, by performing a rolling update.
Finally, rollback that update to the previous version 1.11.10-alpine.

Answer:

solution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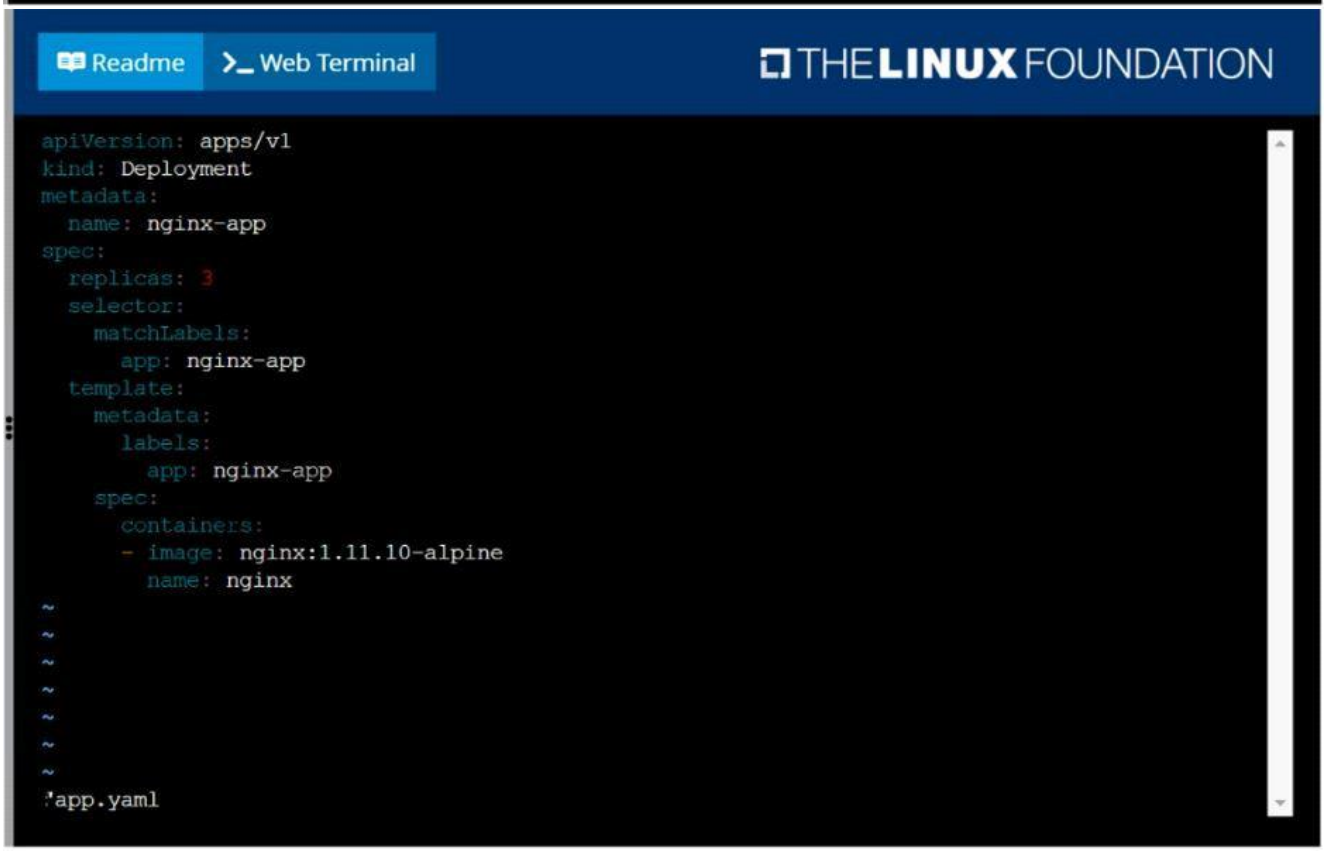
root@node-1:~# k create deploy nginx-app --image=nginx:1.11.10-alpine --dry-run=client -o y
aml > app.yaml
root@node-1:~# vim app.yaml


Readme
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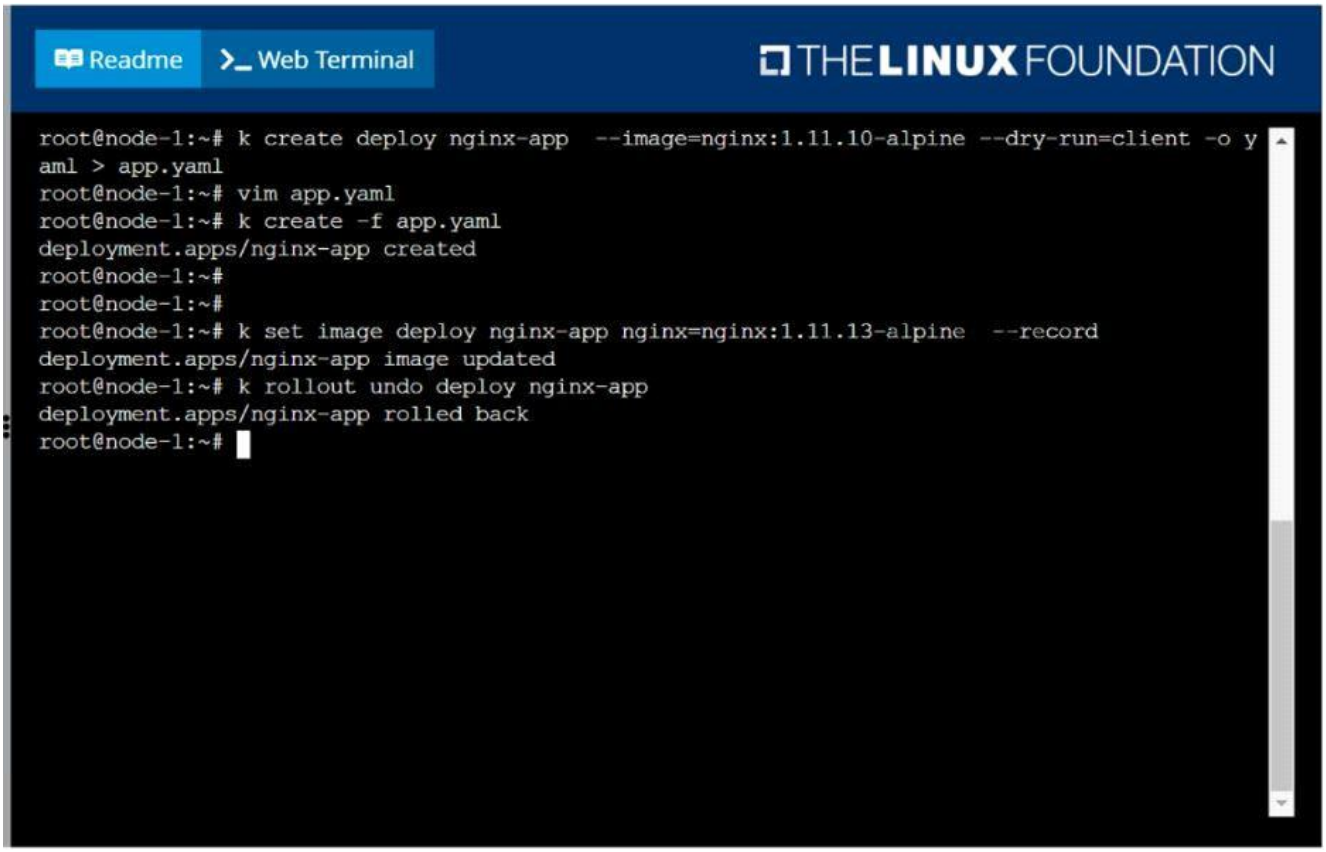
apiVersion: apps/v1
kind: Deployment
metadata:
name: nginx-app
spec:
replicas: 3
selector:
matchLabels:
app: nginx-app
template:
metadata:
labels:
app: nginx-app
spec:
containers:
- image: nginx:1.11.10-alpine
name: nginx
~
~
~
~
~
~
~
"app.yaml



QUESTION NO: 51
Create a namespace called 'development' and a pod with image nginx called nginx on this namespace.
Answer:
kubectl create namespace development
kubectl run nginx --image=nginx --restart=Never -n development

QUESTION NO: 52
List the nginx pod with custom columns POD_NAME and POD_STATUS
Answer:
kubectl get po -o=custom-columns="POD_NAME:.metadata.name, POD_STATUS:.status.containerStatuses[].state"

QUESTION NO: 53
Create a pod that having 3 containers in it? (Multi-Container)
Answer:
image=nginx, image=redis, image=consul
Name nginx container as "nginx-container"
Name redis container as "redis-container"
Name consul container as "consul-container"
Create a pod manifest file for a container and append container section for rest of the images
kubectl run multi-container --generator=run-pod/v1 --image=nginx --dry-run -o yaml > multi-container.yaml

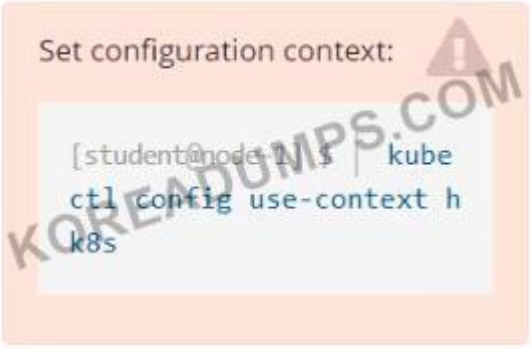
then
vim multi-container.yaml
apiVersion: v1
kind: Pod
metadata:
labels:
run: multi-container
name: multi-container
spec:
containers:
- image: nginx
name: nginx-container
- image: redis
name: redis-container
- image: consul
name: consul-container
restartPolicy: Always

QUESTION NO: 54
For this item, you will have to ssh to the nodes ik8s-master-0 and ik8s-node-0 and complete all tasks on these nodes. Ensure that you return to the base node (hostname: node-1) when you have completed this item.
Context
As an administrator of a small development team, you have been asked to set up a Kubernetes cluster to test the viability of a new application.
Task You must use kubeadm to perform this task. Any kubeadm invocations will require the use of the --ignore-preflight-errors=all option.
Configure the node ik8s-master-O as a master node. .
Join the node ik8s-node-o to the cluster.

Answer:

solution
You must use the kubeadm configuration file located at /etc/kubeadm.conf when initializing your cluster.
You may use any CNI plugin to complete this task, but if you don't have your favourite CNI plugin's manifest URL at hand, Calico is one popular option:
https://docs.projectcalico.org/v3.14/manifests/calico.yaml Docker is already installed on both nodes and apt has been configured so that you can install the required tools.

QUESTION NO: 55
Score: 4%



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

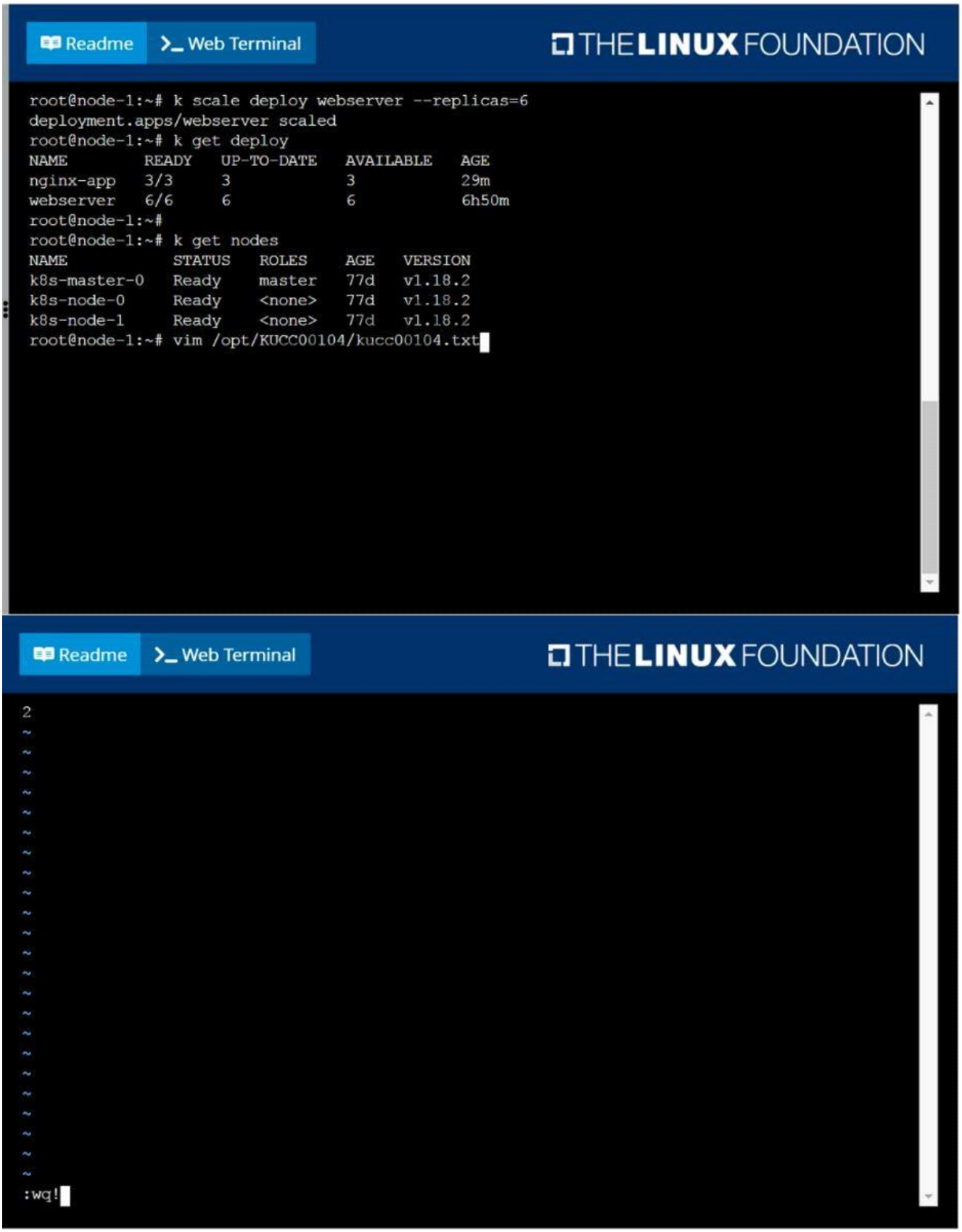
Answer:

Solution:
#vi pv.yaml
apiVersion: v1
kind: PersistentVolume
metadata:
name: app-config
spec:
capacity:
storage: 1Gi
accessModes:
- ReadOnlyMany
hostPath:
path: /srv/app-config
#
kubectl create -f pv.yaml

QUESTION NO: 56
Check to see how many worker nodes are ready (not including nodes tainted NoSchedule) and write the number to /opt/KUCC00104/kucc00104.txt.

Answer:

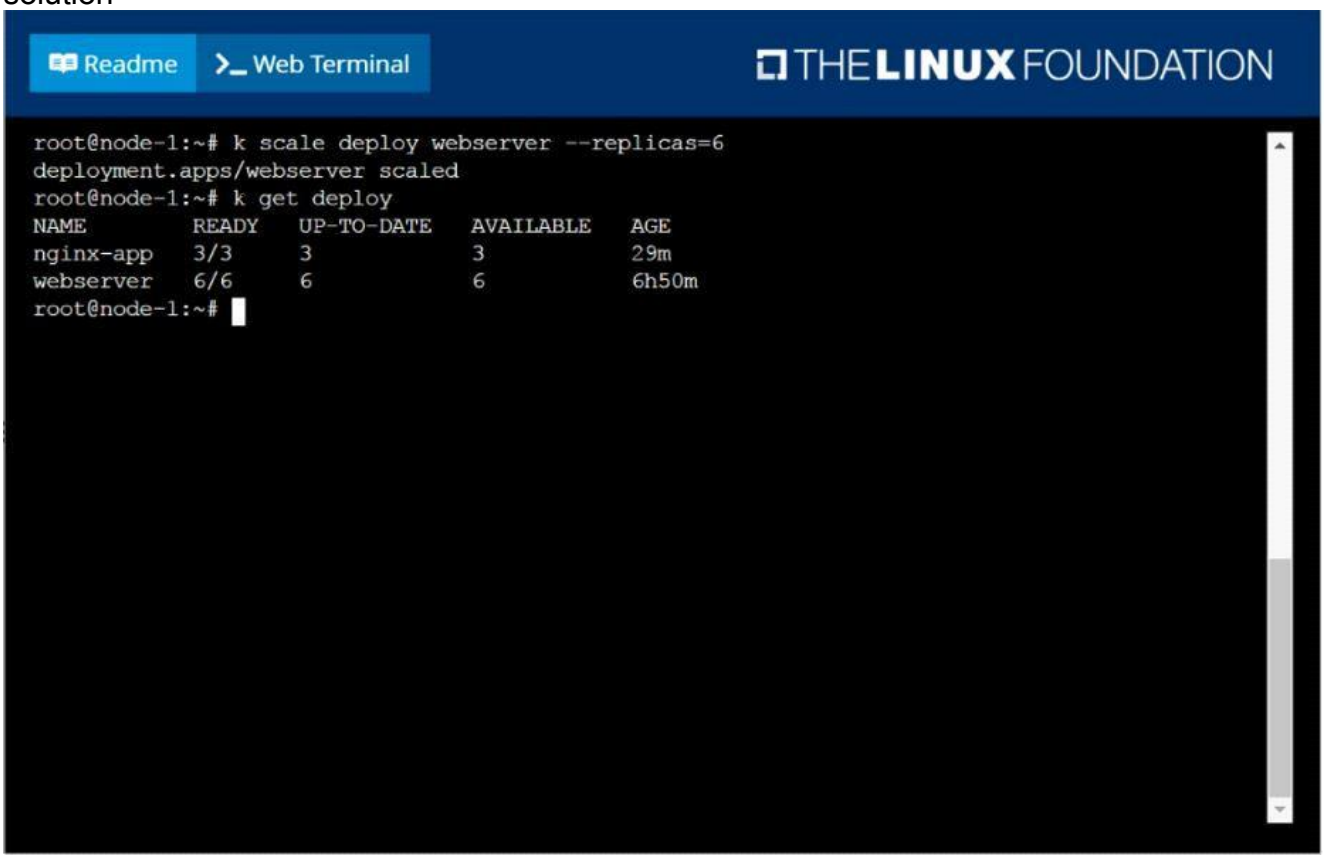
solution



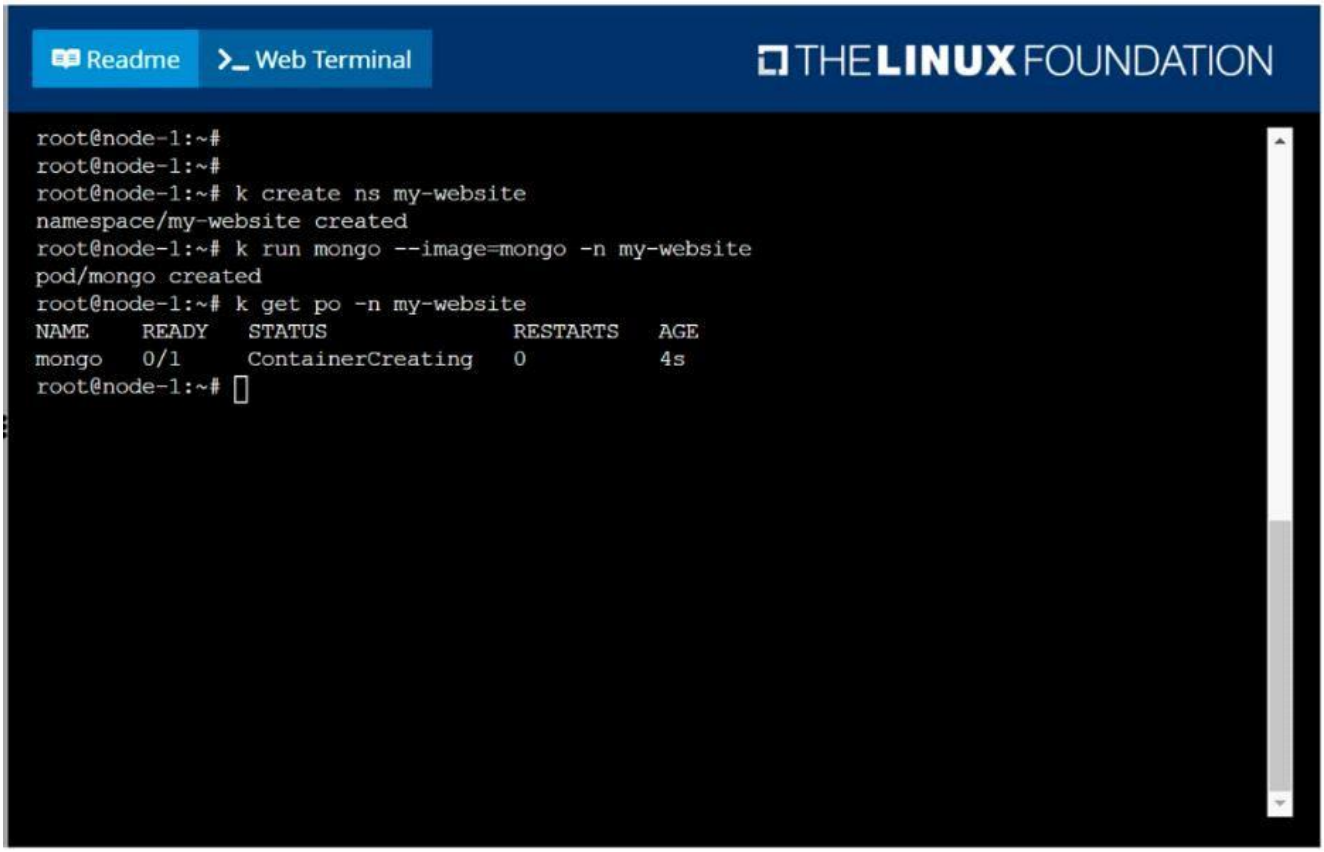
QUESTION NO: 57
List all the pods showing name and namespace with a json path expression
Answer:
kubectl get pods -o=jsonpath="{.items[*]['metadata.name',

'metadata.namespace']}"

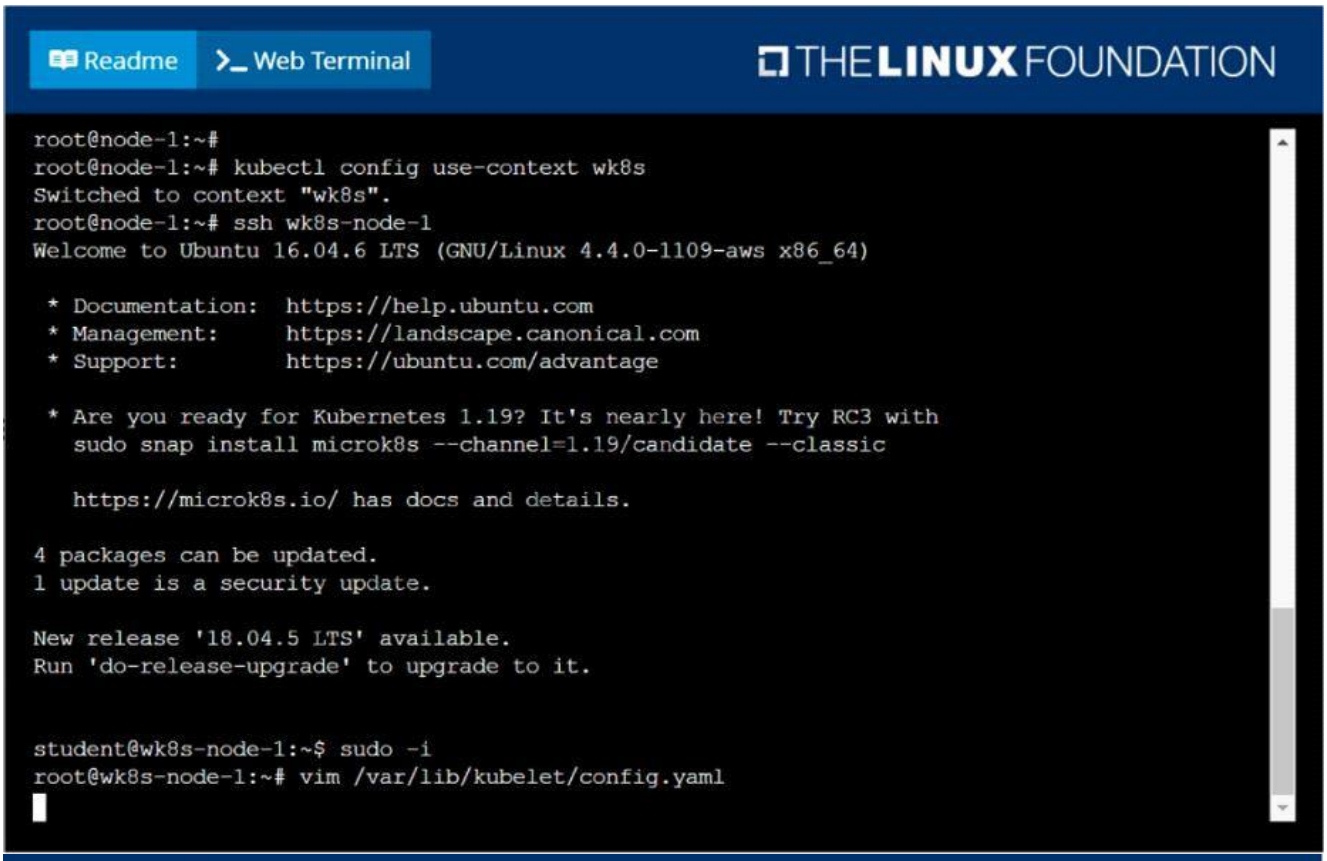
QUESTION NO: 58
Scale the deployment webserver to 6 pods.
Answer:
solution

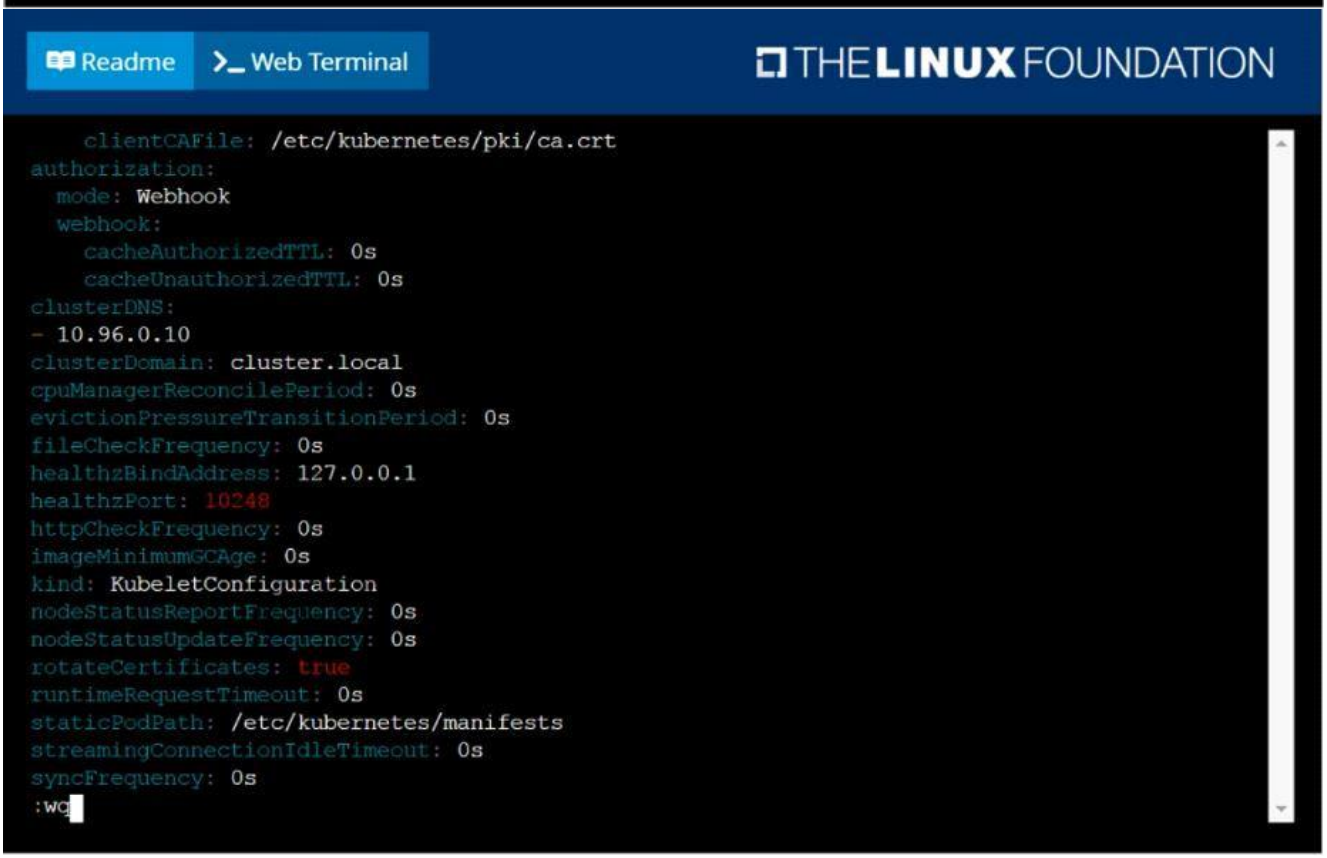


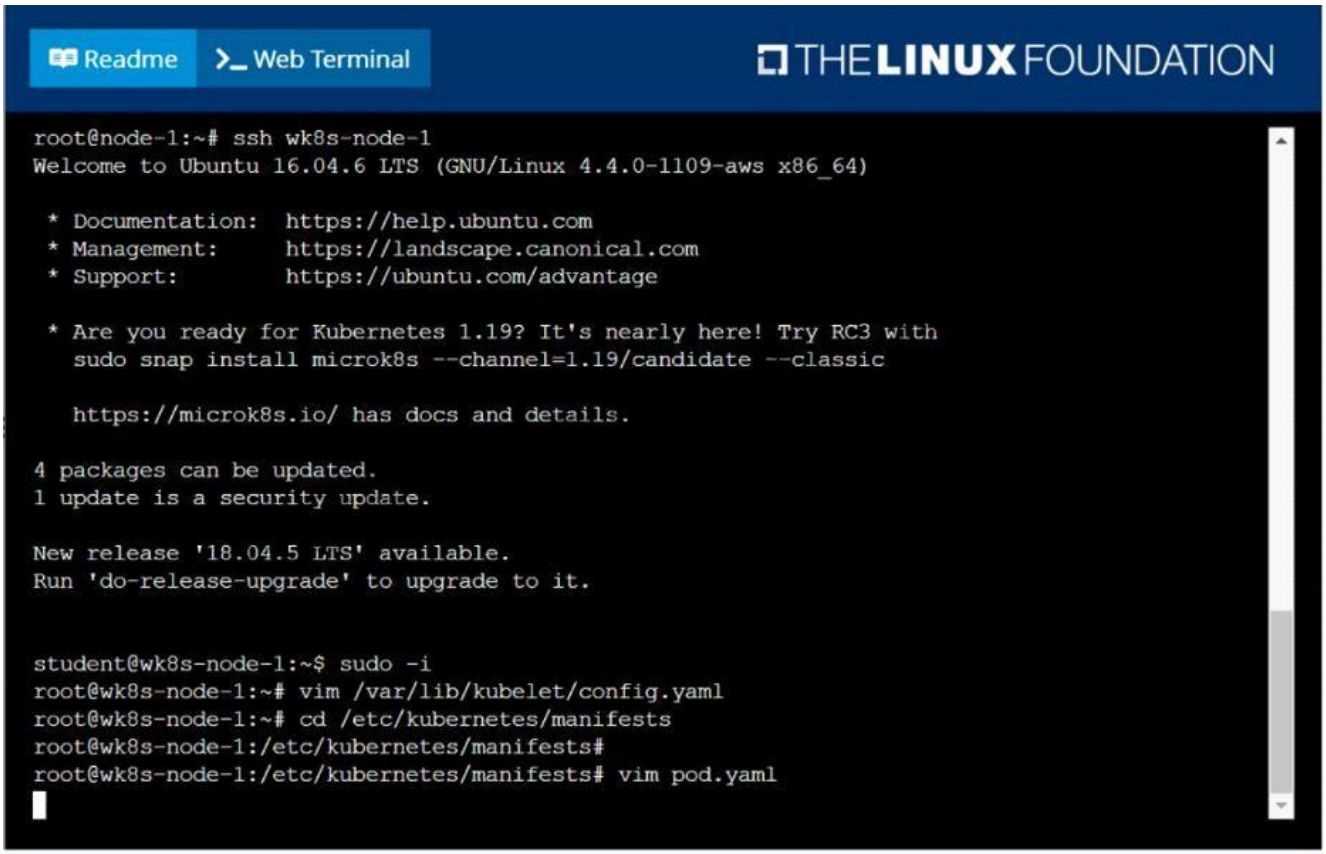
QUESTION NO: 59
Create a pod as follows:
Name: mongo
Using Image: mongo
In a new Kubernetes namespace named: my-website
Answer:
solution

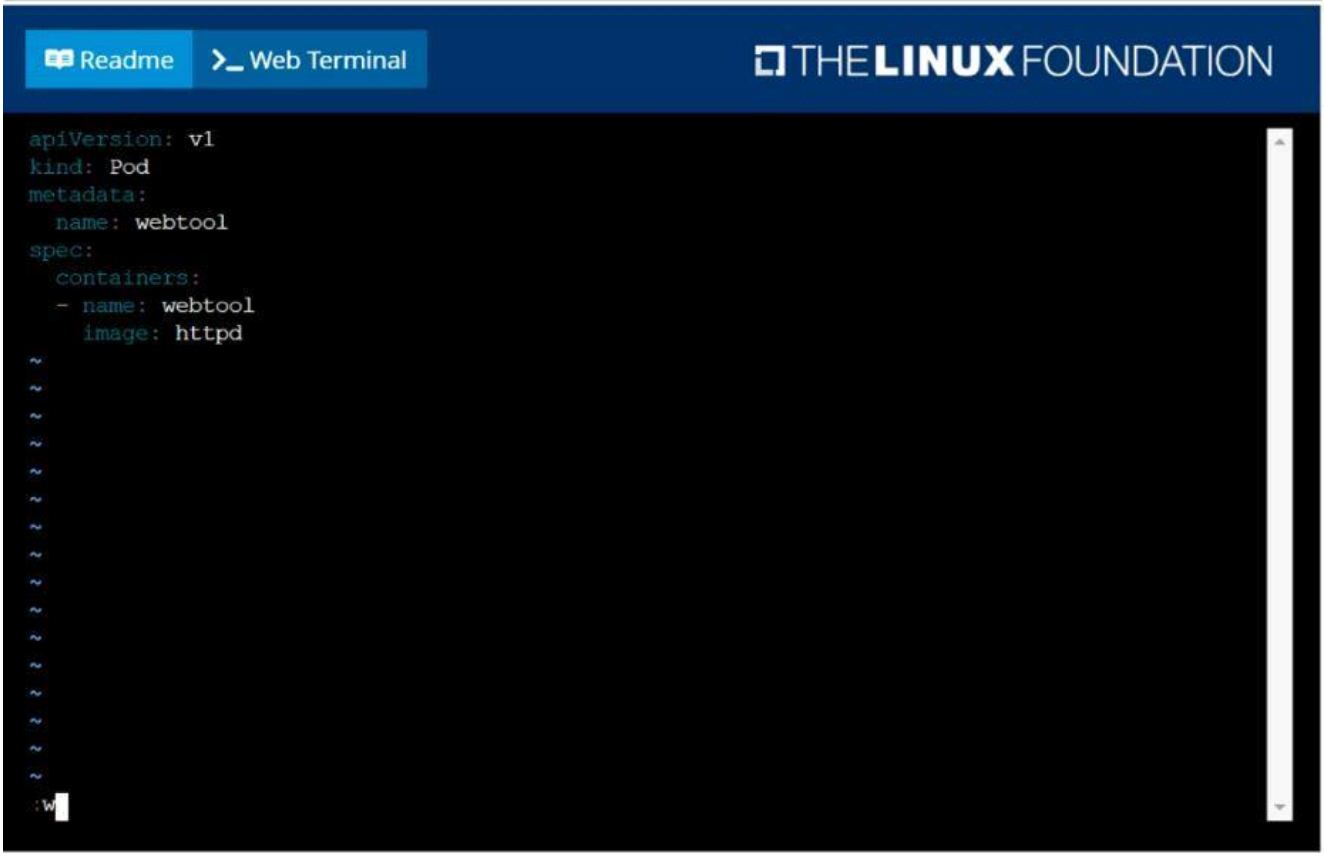


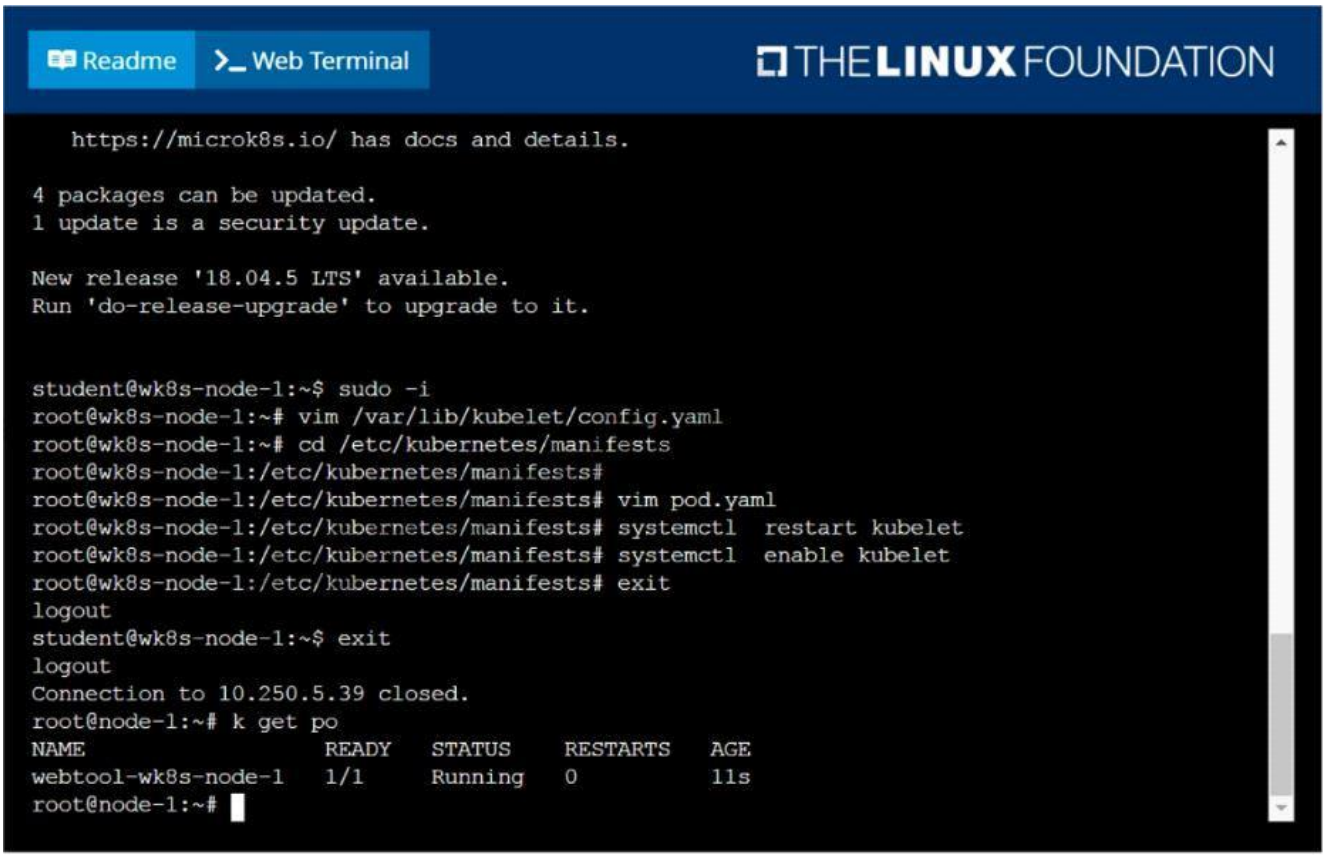
QUESTION NO: 60
Configure the kubelet systemd- managed service, on the node labelled with name=wk8s -node-1, to launch a pod containing a single container of Image httpd named webtool automatically. Any spec files required should be placed in the /etc/kubernetes/manifests directory on the node.
You can ssh to the appropriate node using:
[student@node-1] $ ssh wk8s-node-1
You can assume elevated privileges on the node with the following command:
[student@wk8s-node-1] $ | sudo -i
Answer:
solution


Readme
Web Terminal
THE LINUX FOUNDATION
root@node-1:~#
root@node-1:~# kubectl config use-context wk8s
Switched to context "wk8s".
root@node-1:~# ssh wk8s-node-1
Welcome to Ubuntu 16.04.6 LTS (GNU/Linux 4.4.0-1109-aws x86_64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/advantage
* Are you ready for Kubernetes 1.19? It's nearly here! Try RC3 with
sudo snap install microk8s --channel=1.19/candidate --classic
https://microk8s.io/ has docs and details.
4 packages can be updated.
1 update is a security update.
New release '18.04.5 LTS' available.
Run 'do-release-upgrade' to upgrade to it.
student@wk8s-node-1:~$ sudo -i
root@wk8s-node-1:~# vim /var/lib/kubelet/config.yaml


Readme
Web Terminal
THE LINUX FOUNDATION
clientCAFile: /etc/kubernetes/pki/ca.crt
authorization:
mode: Webhook
webhook:
cacheAuthorizedTTL: 0s
cacheUnauthorizedTTL: 0s
clusterDNS:
- 10.96.0.10
clusterDomain: cluster.local
cpuManagerReconcilePeriod: 0s
evictionPressureTransitionPeriod: 0s
fileCheckFrequency: 0s
healthzBindAddress: 127.0.0.1
healthzPort: 10248
httpCheckFrequency: 0s
imageMinimumGCAge: 0s
kind: KubeletConfiguration
nodeStatusReportFrequency: 0s
nodeStatusUpdateFrequency: 0s
rotateCertificates: true
runtimeRequestTimeout: 0s
staticPodPath: /etc/kubernetes/manifests
streamingConnectionIdleTimeout: 0s
syncFrequency: 0s
:wq


Readme
Web Terminal
THE LINUX FOUNDATION
root@node-1:~# ssh wk8s-node-1
Welcome to Ubuntu 16.04.6 LTS (GNU/Linux 4.4.0-1109-aws x86_64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/advantage
* Are you ready for Kubernetes 1.19? It's nearly here! Try RC3 with
sudo snap install microk8s --channel=1.19/candidate --classic
https://microk8s.io/ has docs and details.
4 packages can be updated.
1 update is a security update.
New release '18.04.5 LTS' available.
Run 'do-release-upgrade' to upgrade to it.
student@wk8s-node-1:~$ sudo -i
root@wk8s-node-1:~# vim /var/lib/kubelet/config.yaml
root@wk8s-node-1:~# cd /etc/kubernetes/manifests
root@wk8s-node-1:/etc/kubernetes/manifests#
root@wk8s-node-1:/etc/kubernetes/manifests# vim pod.yaml


Readme
Web Terminal
THE LINUX FOUNDATION
apiVersion: v1
kind: Pod
metadata:
name: webtool
spec:
containers:
- name: webtool
image: httpd
:w



QUESTION NO: 61
Score:7%

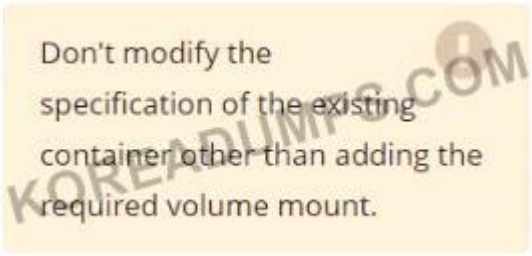
Task
Create a new PersistentVolumeClaim
* Name: pv-volume
* Class: csi-hostpath-sc
* Capacity: 10Mi
Create a new Pod which mounts the PersistentVolumeClaim as a volume:
* Name: web-server
* Image: nginx
* Mount path: /usr/share/nginx/html
Configure the new Pod to have ReadWriteOnce access on the volume.
Finally, using kubectl edit or kubectl patch expand the PersistentVolumeClaim to a capacity of 70Mi and record that change.

Answer:

Solution:
vi pvc.yaml
storageclass pvc
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
name: pv-volume
spec:
accessModes:
- ReadWriteOnce
volumeMode: Filesystem
resources:
requests:
storage: 10Mi
storageClassName: csi-hostpath-sc
vi pod-pvc.yaml
apiVersion: v1
kind: Pod
metadata:
name: web-server
spec:
containers:
- name: web-server
image: nginx
volumeMounts:
- mountPath: "/usr/share/nginx/html"
name: my-volume
volumes:
- name: my-volume
persistentVolumeClaim:
claimName: pv-volume
craete
kubectl create -f pod-pvc.yaml
#edit
kubectl edit pvc pv-volume --record

QUESTION NO: 62
Score:7%

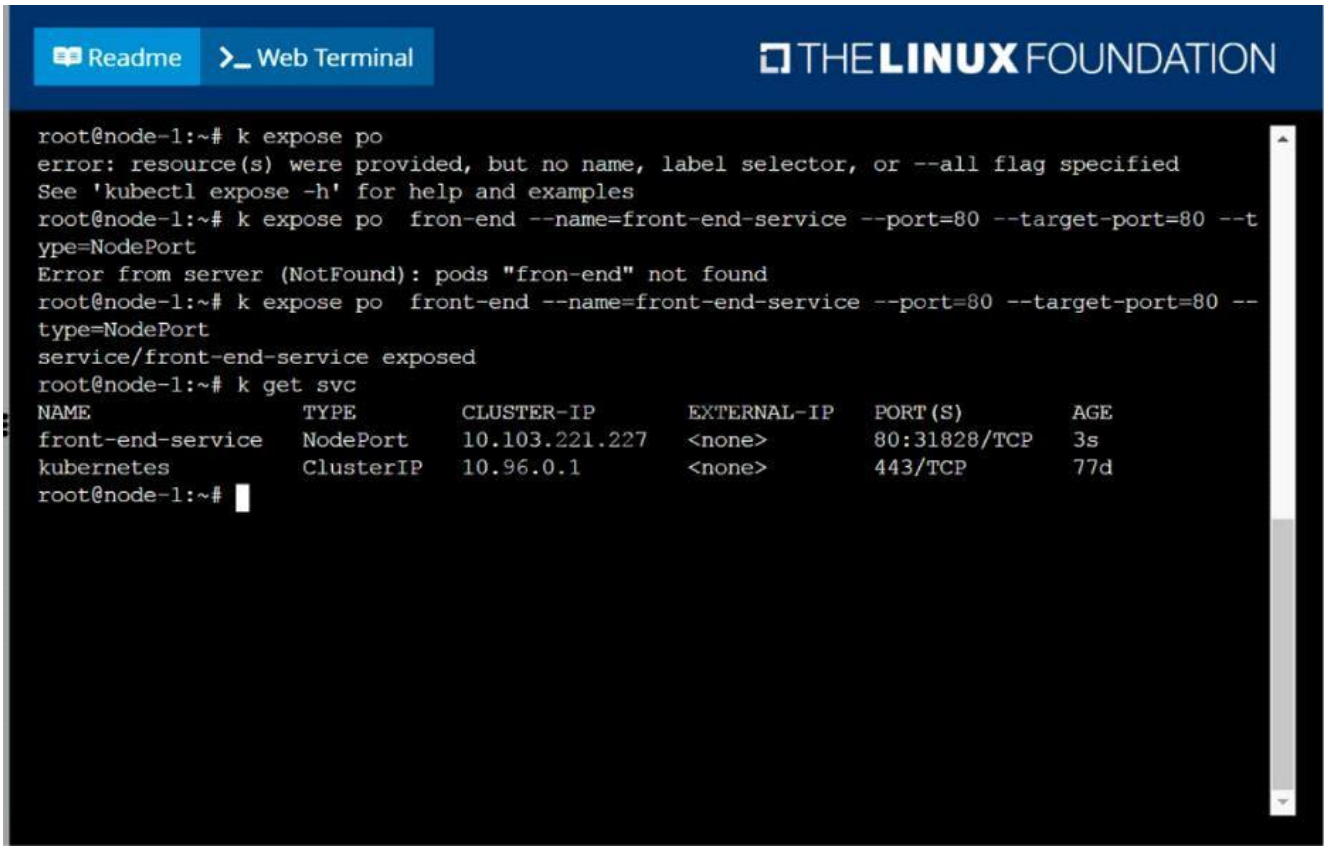
Context
An existing Pod needs to be integrated into the Kubernetes built-in logging architecture (e. g. kubectl logs). Adding a streaming sidecar container is a good and common way to accomplish this requirement.
Task
Add a sidecar container named sidecar, using the busybox Image, to the existing Pod big-corp-app. The new sidecar container has to run the following command:
/bin/sh -c tail -n+1 -f /va r/log/big-corp-app.log
Use a Volume, mounted at /var/log, to make the log file big-corp-app.log available to the sidecar container.



Answer:
Solution:
#
kubectl get pod big-corp-app -o yaml
#
apiVersion: v1
kind: Pod
metadata:
name: big-corp-app
spec:
containers:
- name: big-corp-app
image: busybox
args:
- /bin/sh
- -c
- >
i=0;
while true;

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

QUESTION NO: 63
Create and configure the service front-end-service so it's accessible through NodePort and routes to the existing pod named front-end.
Answer:
solution

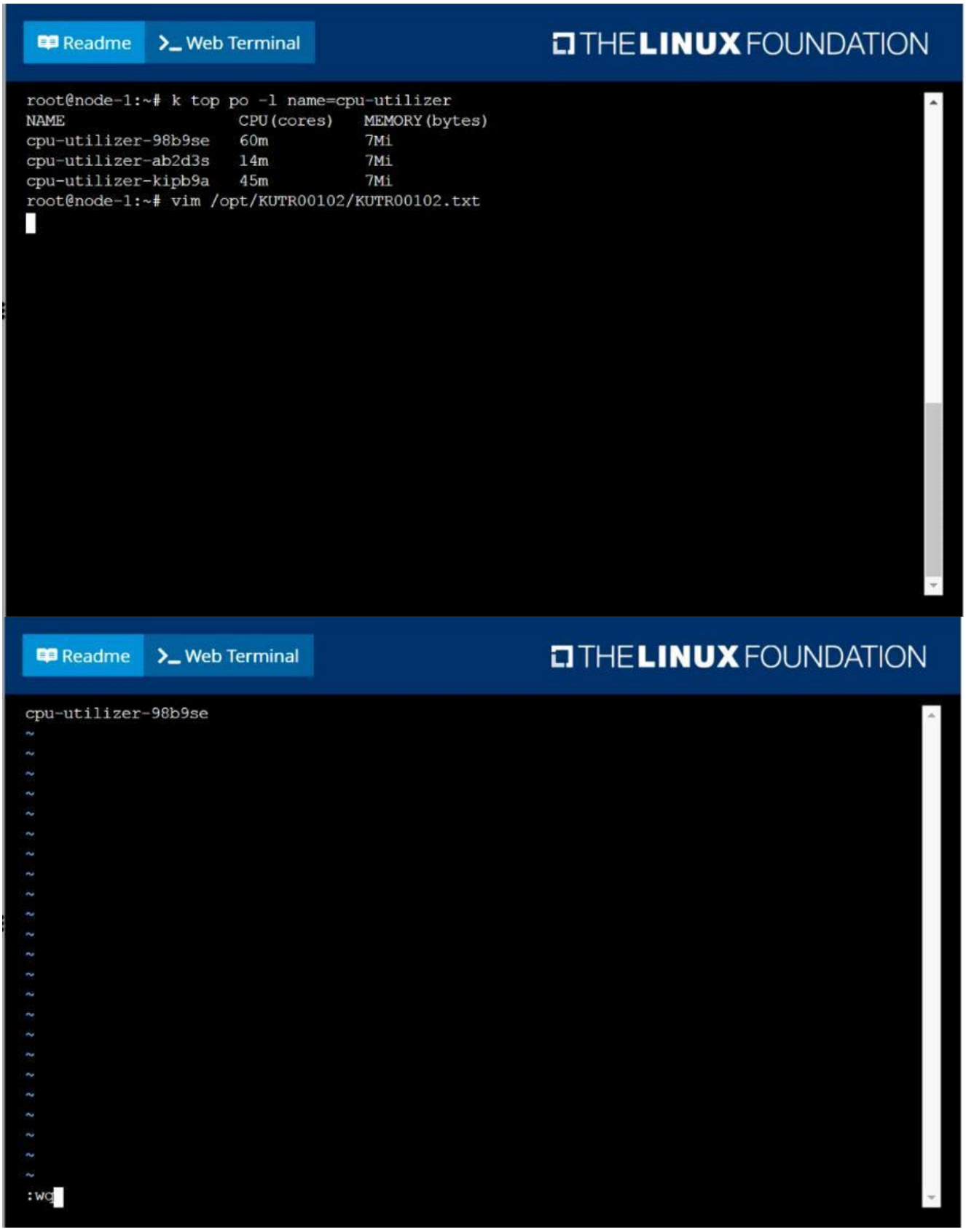


QUESTION NO: 64

From the pod label name=cpu-utilizer, find pods running high CPU workloads and write the name of the pod consuming most CPU to the file /opt/KUTR00102/KUTR00102.txt (which already exists).

Answer:

solution

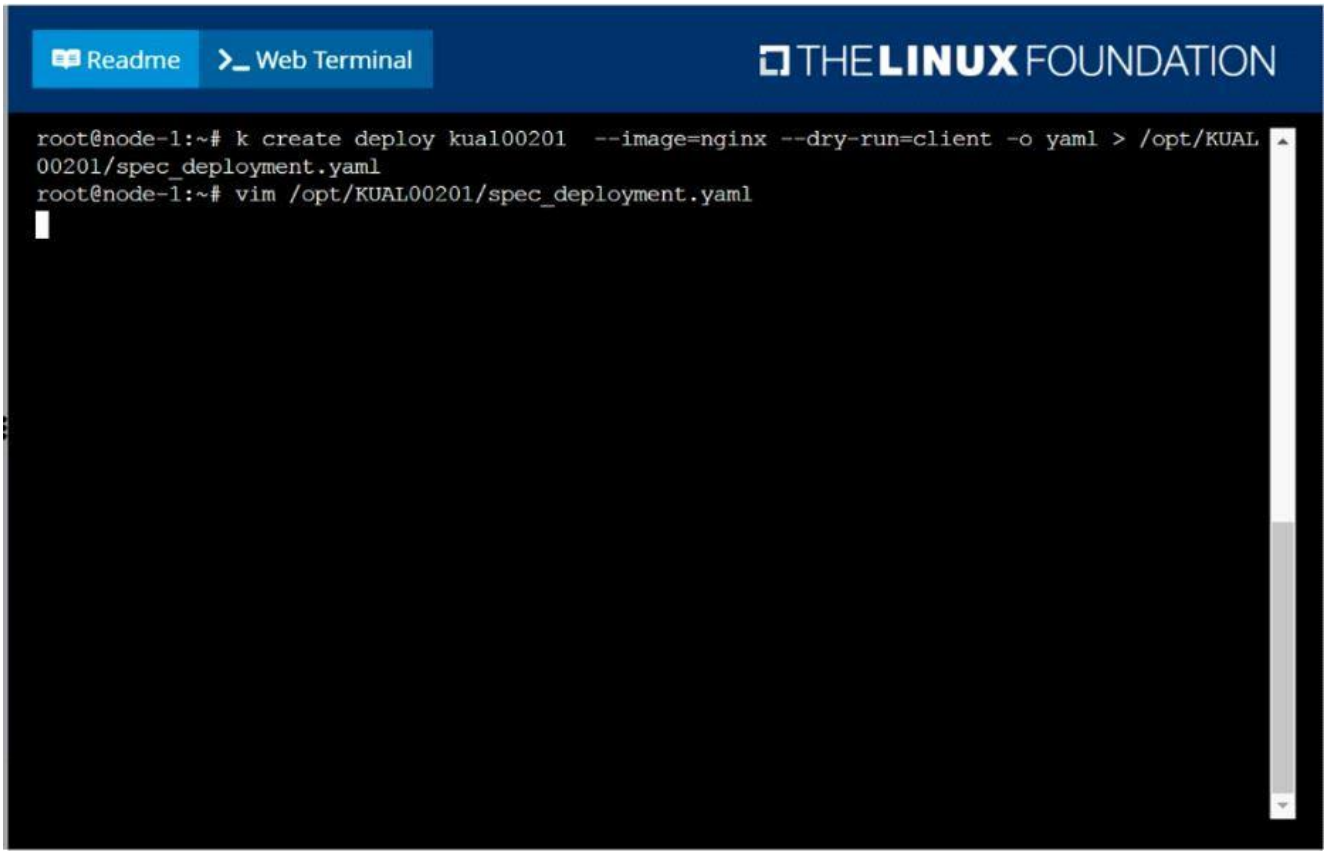


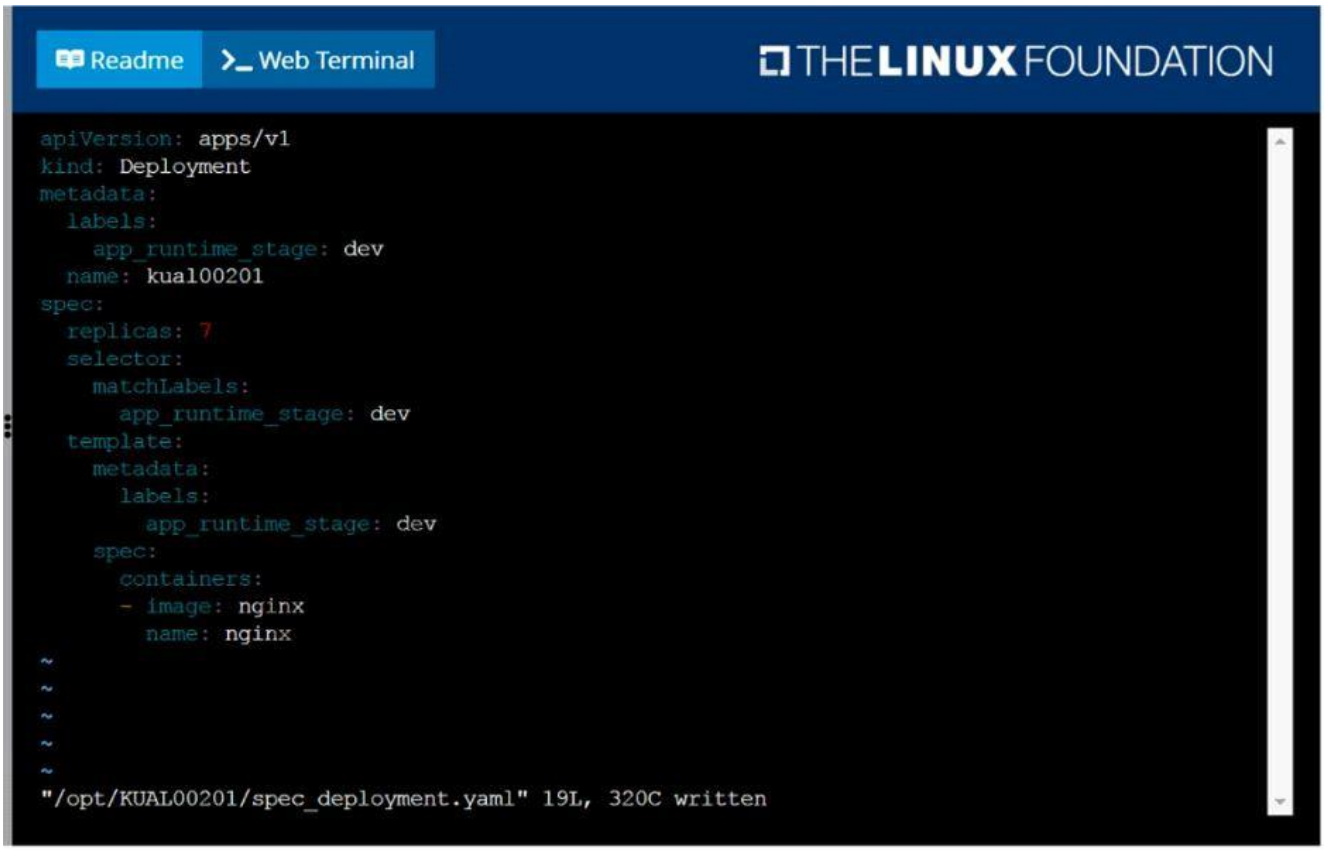
QUESTION NO: 65
Create a deployment spec file that will:
Launch 7 replicas of the nginx Image with the label app_runtime_stage=dev deployment name: kual00201 Save a copy of this spec file to /opt/KUAL00201/spec_deployment.yaml (or

/opt/KUAL00201/spec_deployment.json).
When you are done, clean up (delete) any new Kubernetes API object that you produced during this task.

Answer:

solution





QUESTION NO: 66
Create a pod that echo "hello world" and then exists. Have the pod deleted automatically when it's completed

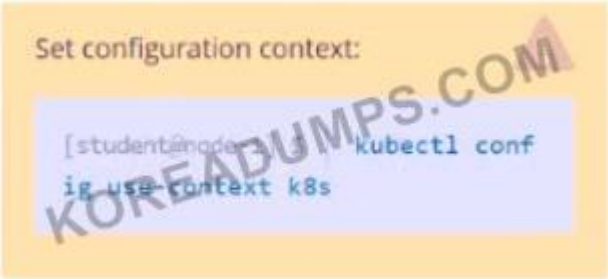
Answer:
kubectl run busybox --image=busybox -it --rm --restart=Never --
/bin/sh -c 'echo hello world'
kubectl get po # You shouldn't see pod with the name "busybox"

QUESTION NO: 67
Score: 7%

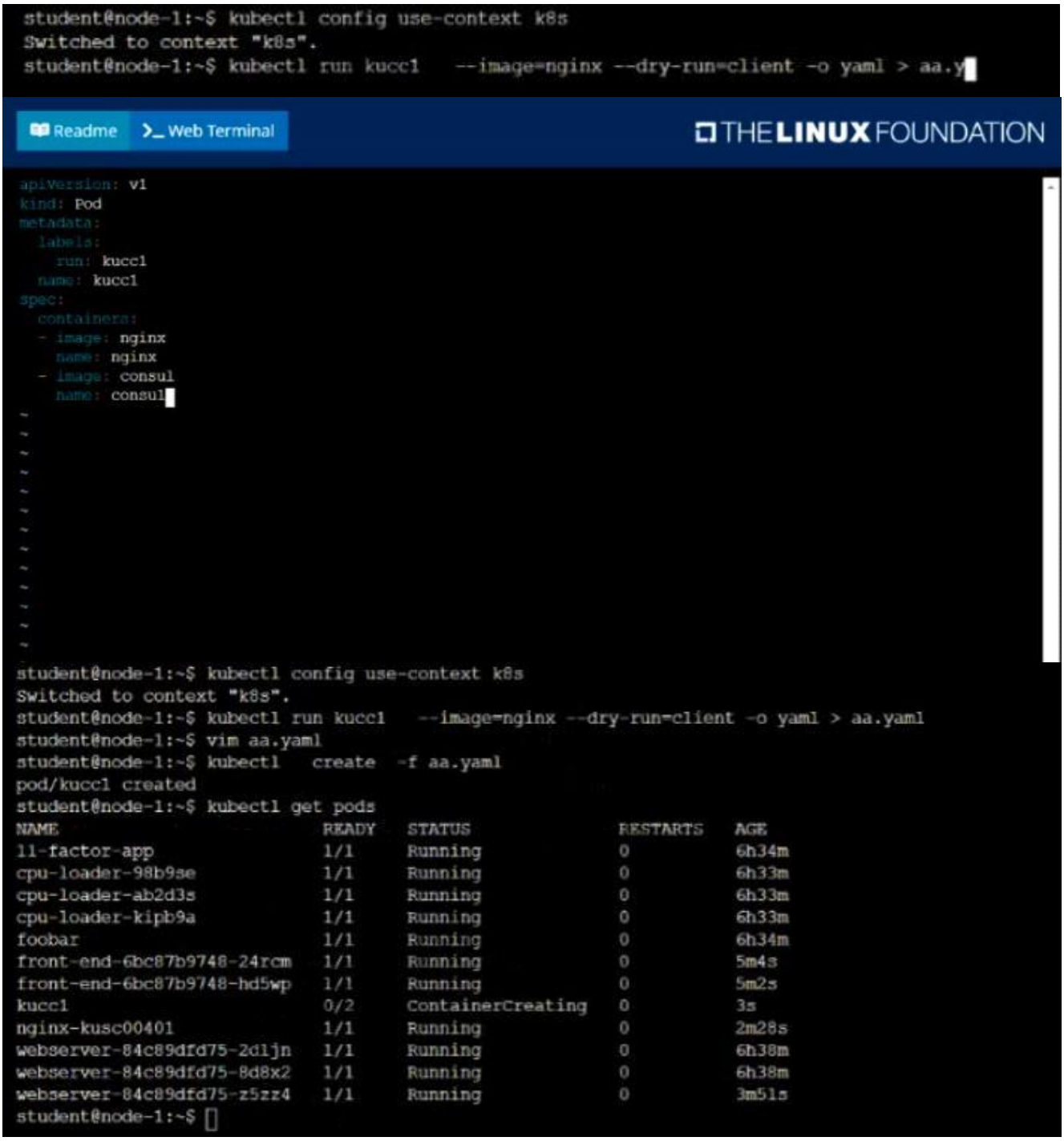
Task
Reconfigure the existing deployment front-end and add a port specification named http exposing port 80/tcp of the existing container nginx.
Create a new service named front-end-svc exposing the container port http.
Configure the new service to also expose the individual Pods via a NodePort on the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

Answer:
Solution:
kubectl get deploy front-end
kubectl edit deploy front-end -o yaml
#port specification named http
#service.yaml
apiVersion: v1
kind: Service
metadata:
name: front-end-svc
labels:
app: nginx
spec:
ports:
- port: 80
protocol: tcp
name: http
selector:
app: nginx
type: NodePort
kubectl create -f service.yaml
kubectl get svc
port specification named http
kubectl expose deployment front-end --name=front-end-svc --port=80 --tarport=80 --type=NodePort

QUESTION NO: 68
Task Weight: 4%



Task
Schedule a Pod as follows:
* Name: kucc1
* App Containers: 2
* Container Name/Images:
o nginx
o consul
Answer:
Solution:


student@node-1:~$ kubectl config use-context k8s
Switched to context "k8s".
student@node-1:~$ kubectl run kucc1 --image=nginx --dry-run=client -o yaml > aa.y
Readme
Web Terminal
THE LINUX FOUNDATION
apiVersion: v1
kind: Pod
metadata:
labels:
run: kucc1
name: kucc1
spec:
containers:
- image: nginx
name: nginx
- image: consul
name: consul
student@node-1:~$ kubectl config use-context k8s
Switched to context "k8s".
student@node-1:~$ kubectl run kucc1 --image=nginx --dry-run=client -o yaml > aa.yaml
student@node-1:~$ vim aa.yaml
student@node-1:~$ kubectl create -f aa.yaml
pod/kucc1 created
student@node-1:~$ kubectl get pods
NAME READY STATUS RESTARTS AGE
11-factor-app 1/1 Running 0 6h34m
cpu-loader-98b9se 1/1 Running 0 6h33m
cpu-loader-ab2d3s 1/1 Running 0 6h33m
cpu-loader-kipb9a 1/1 Running 0 6h33m
foobar 1/1 Running 0 6h34m
front-end-6bc87b9748-24rcm 1/1 Running 0 5m4s
front-end-6bc87b9748-hd5wp 1/1 Running 0 5m2s
kucc1 0/2 ContainerCreating 0 3s
nginx-kusc00401 1/1 Running 0 2m28s
webserver-84c89dfd75-2dljn 1/1 Running 0 6h38m
webserver-84c89dfd75-8d8x2 1/1 Running 0 6h38m
webserver-84c89dfd75-z5zz4 1/1 Running 0 3m51s
student@node-1:~$