**Openshift-EX280-Version\_4.2** **Duration**: 3 Hrs

**Max.Mark**:300 **PassMark:** 210

***Initial Setup***

|  |  |  |
| --- | --- | --- |
| **S.NO** | ***DOMAIN NAME*** | ***IP ADDRESS*** |
| 1 | Workbench.lab.example.com | 172.25.250.11 |
| 2 | Master.lab.example.com | 172.25.250.12 |
| 3 | Node1.lab.example.com | 172.25.250.13 |
| 4 | Node2.lab.example.com | 172.25.250.14 |
| 5 | Utility.lab.example.com | 172.25.250.15 |

1. Wild-card domain for the cluster: apps-crc.testing
2. Documentation about openshift can be accessed at the following url:

[***https://access.redhat.com/documentation/en-us/openshift\_container\_platform/4.2/***](https://access.redhat.com/documentation/en-us/openshift_container_platform/4.2/)

1. Kubeadmin password will be available in the location as /root/kubeadmin.conf
2. Root password for login in to workbench VM will be provided in the exam itself

***Question Outline***

1. Configure the Identity Provider for the Openshift
2. Configure Cluster permissions
3. Configure Project permissions
4. Create Groups and configure permissions
5. Configure Quotas for the Project
6. Configure Limits for the Project
7. Deploy an Application
8. Configure and Deploy an secure route
9. Scale the Application manually
10. Configure Auto-scaling for an Application
11. Configure an Secret
12. Use the Secret value for Application Deployment
13. Configure an Service Account
14. Deploy an Application
15. Deploy an Application
16. Deploy an Application

***Detailed Questions***

1. Configure the Identity Provider for the Openshift

* Create an Htpass Identity Provider with the name: htpass-ex280
* Create the secret for Identity provider users: htpass-idp-ex280
* Create the user account jobs with password deluges
* Create the user account wozniak with password grannies
* Create the user account collins with password culverins
* Create the user account adlerin with password artiste
* Create the user account armstrong with password spacesuits

ANSWER:

**STEP-1:**

Install the httpd-tools package in the workbench machine

#yum install httpd-tools (only for exam)

#lab execute-troubleshoot start (not for exam)

#cat /usr/local/etc/ocp4.config

#oc login –u kubeadmin –p <given passwd> <given api URL>

# oc whoami

Then create a directory and save the htpasswd users credentials under it

#mkdir mypass

#htpasswd –c –B –b mypass/users jobs deluges

#htpasswd –B –b mypass/users wozniak grannies

#htpasswd –B –b mypass/users collins culverins

#htpasswd –B –b mypass/users adlerin artiste

#htpasswd –B –b mypass/users armstrong spacesuits

#cat /mypass/users

**STEP-2:**

Import the htpasswd users file in to the opensshift as the secret in to the project called openshift-config

#oc create secret generic htpass-idp-ex280 - -from-file htpasswd=mypass/users –n openshift-config

# oc get secret htpass-idp-ex280 –o yaml –n openshift-config

**STEP-3:**

Configure the Oauth server to use HTPass Identity Provider.

Use the provided Documentation to get the file, copy the file and change the appropriate value as highlighted

Authentication -🡪 4. Authentication and authorization <4.1.5>

#vim oauth.yaml

apiVersion: config.openshift.io/v1

kind: Oauth

metadata:

name: cluster

spec:

identityProviders:

- name: htpass-ex280

mappingMethod: claim

type: HTPasswd

htpasswd:

fileData:

name: htpass-idp-ex280

#oc replace –f oauth.yaml

#oc get oauth cluster –o yaml

**STEP-4:**

Login as all the users and verify. You should be able to login sucessfully

#oc login –u <user\_name> -p <password\_of\_user>

1. Configure Cluster permissions

* User jobs is able to modify the cluster
* wozniak is able to create project
* amstrong cannot create projects
* wozniak cannot modify the cluster
* Remove the kubeadmin user from the cluster

ANSWER:

* User jobs is able to modify the cluster

#oc adm policy add-cluster-role-to-user cluster-admin jobs

* wozniak is able to create project

#oc adm policy remove-cluster-role-from-group self-provisioner system:authenticated:oauth

#oc adm policy add-cluster-role-to-user self-provisioner wozniak

* amstrong cannot create projects

Login as that user and verify that he is not able to create project. No need to make any configuration change.

* wozniak cannot modify the cluster

Login as that user and verify that he is not able to execute cluster level commands like “oc get nodes”. No need to make any configuration change.

* Remove the kubeadmin user from the cluster

Don’t practice this command in the lab and only do it in the exam

#oc delete secret kubeadmin –n kube-system

1. Configure Project permissions
   1. Create following projects
      1. apollo
      2. titan
      3. gemini
      4. bluebook
      5. apache
   2. User armstrong is admin for the apollo and titan project
   3. User Collins is able to view the apollo project

ANSWER:

1. #oc new-project apollo

#oc new-project titan

#oc new-project gemini

#oc new-project bluebook

#oc new-project apache

# oc get project

1. #oc adm policy add-role-to-user admin armstrong –n apollo

#oc adm policy add-role-user admin armstrong –n titan

1. #oc adm policy add-role-to-user view collins –n apollo

#oc get rolebinding –o wide -n apollo

#oc get rolebinding –o wide –n titan

1. Create Groups and configure permissions
   1. Create a group called commander and user wozniak is the member of this group
   2. Create a group called pilot and user adlerin is the member of this group
   3. The commander group members are able to edit the Apollo and Titan project
   4. The pilot group members are able to view Apollo project but not edit it.

ANSWER:

1. #oc adm groups new commander

#oc adm groups add-users commander wozniak

1. #oc adm groups new pilot

#oc adm groups add-users pilot adlerin

1. #oc adm policy add-role-to-group admin commander –n apollo

#oc adm policy add-role-to-group admin commander –n titan

1. #oc adm policy add-role-to-group view pilot –n apollo

1. Configure Quotas for the Project

Create Resource Quota in manhattan project named ex280-quota

* 1. The amount of memory consumed across all containers may not exceed 1Gi
  2. The amount of CPU across all containers may not exceed 2 full cores.
  3. The maximum number of replication controllers does not exceed 3
  4. The maximum number of pods does not exceed 3
  5. The maximum number of services does not exceed 6

ANSWER:

#oc create quota ex280-quota - -hard limits.memory=1Gi,limits.cpu=2,replicationcontrollers=3,pods=3,services=6

To Verify: #oc describe resourcequota ex280-quota

# oc delete resourcequota ex280-quota <if you want delete and recreate mean use it>

1. Configure Limits for the Project

Create a Limit Range in the bluebook project name ex280-limits

* 1. The amount of memory consumed by a single pod is between 100Mi and 300Mi
  2. The amount of cpu consumed by a single pod is between 10m and 500m
  3. The amount of cpu consumed by a single container is between 10m and 500m with a default request value of 100m
  4. The amount of memory consumed by a single container is between 100Mi and 300Mi with a default request value of 100Mi

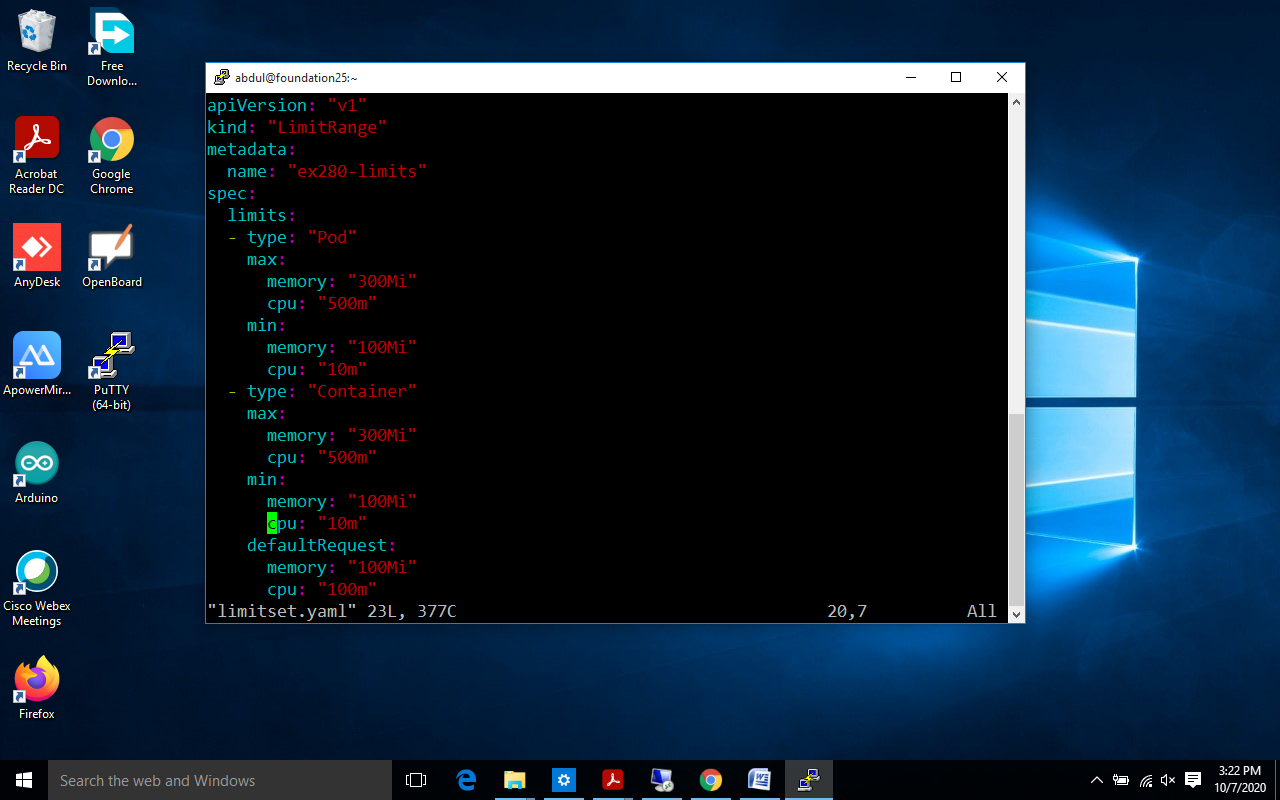
ANSWER:

#oc project bluebook

#vim limits.yaml

The content of the file should be as in the screen-shot with same indentation

Develop ->nodes->limit (6.3.2)



#oc create –f limits.yaml

To Verify: #oc describe limitranges ex280-limits

1. Deploy an Application

Deploy an application a called rocky in bluewills project

* 1. The application should be reachable from the following url:

<http://rocky.apps-crc.testing>

* 1. You should get valid Output

ANSWER:

Download the all given file and execute two script file

1. #sh project.sh
2. # sh startscenario.sh

After executing above commands please start below question this action not for global exam

STEP-1:

Remove the taints in the worker nodes, in exam there will be two worker nodes. We need to remove the taints on both the nodes.

#oc project bluewills

#oc get nodes [To list the available nodes]

#oc describe node <node\_name> | grep Taints

#oc adm taint node <node\_name> <taint\_value>-

In practice we have only one node available so it’s enough to remove in the one node

#oc adm taint node master01 node-

STEP-2:

Compare the given route with route provided in the question and delete the existing route and create the new route as provided in the questions

#oc get route

#oc delete route rocky

#oc get route

#oc expose service rocky --hostname=rocky.apps.ocp4.example.com

#oc get route

#curl rocky.apps.ocp4.example.com

Or open in the browser

1. Configure and Deploy an secure route

Deploy an application called oxcart securely in the project called area51

* 1. The application has self-signed certificate available at

"/C=US/ST=NC/L=Raleigh/O=RedHat/OU=RHT/CN=oxcart.apps-crc.testing"

* 1. The application should be reachable at the following url

https://oxcart.apps.ocp4.example.com

* 1. Application produces a valid Output

ANSWER:

#oc project area51 🡪 Change to the project

#oc get pods 🡪 Check the pod status

#oc get route

#oc delete route oxcart 🡪Delete the route because it is insecure

oc get route 🡪Verify it

##Step01 ##Generate Private key

#mkdir cert

#cd cert/

#openssl genrsa -out oxcart.key 2048

##Step02 ##Generate CSR

openssl req -new -key oxcart.key -out oxcart.csr -subj="/C=US/ST=NC/L=Raleigh/O=RedHat/OU=RHT/CN=oxcart.apps-crc.testing "

##Step03 ##Generate TLS Certificate

openssl x509 -req -days=365 -signkey oxcart.key -in oxcart.csr -out oxcart.crt

##step3 Create the Edge Route

#oc get service

#oc create route edge --service=oxcart --cert=oxcart.crt --key=oxcart.key –hostname=oxcart.apps-crc.testing

#oc get route

verify the URL using firefox

https://oxcart.apps.ocp4.example.com

1. Scale the Application manually

Scale an application called hydra in the project called lerna

The hydra application should be scaled to five times

ANSWER:

#oc project lerna

#oc get all | grep deploy

#oc scale --replicas=5 deployment.apps/hydra

#oc get pods

1. Configure Autoscaling for an Application

Configure an autoscaling for the scala application in the project gru with following specification

* 1. Minimum number of replicas: 6
  2. Maximum number of replicas: 40
  3. Threshold CPU-Percentage: 60
  4. Application resource of CPU Request: 25m
  5. Application limits of CPU Limits: 100m

#oc project gru

#oc get pods

#oc get all | grep deploy

**Set Autoscaling:**

#oc autoscale --min=6 --max=40 --cpu-percent=60 deployment.apps/scala

#oc get hpa

**Set Application Resources:**

#oc set resources --requests cpu=25m --limits cpu=100m deployment.apps/scala

#oc describe deployment.apps/scala | grep –A5 Limits

1. Configure an Secret

Configure a secret in the math project and the name of secret should be magic.

The secret should have following key value pairs

Decoder\_Ring: ASDA142hfh-gfrhhueo-erfdk345v

ANSWER:

#oc project math

#oc create secret generic magic --from-literal Decoder\_Ring=ASDA142hfh-gfrhhueo-erfdk345v

#oc get secret magic -o yaml

1. Use the Secret value for Application Deployment

Configure the environmental variable for the application called qed in the math project so that it use the secret “magic”

After configuring the environmental value for the application it should stop producing the following output

“App is not configured properly”

ANSWER

# oc get pods

# oc describe pod qed-7766d4df7-5l9wx | grep –A1 Environment

# oc get all | grep deploy

# oc set env --from secret/magic deployment.apps/qed

# oc describe pod qed-5ddb5b5cfc-bjqkw | grep -A1 Environment

1. Configure an Service Account

Create an service account called ex-280-sa in the project called apples

This service account should able to run application with any user id.

ANSWER

#oc project apples

#oc create serviceaccount ex-280-sa

#oc get sa

#oc adm policy add-scc-to-user anyuid -z ex-280-sa

#oc get clusterrolebinding -o wide | grep ex-280-sa

1. Deploy an Application

Deploy an application called oranges in the project called apples

* 1. This application should use the service account ex-280-sa
  2. The Application should produce a valid output

#oc get pods

#oc logs oranges-bc578f98d-mm8d6

#oc get all | grep deploy

#oc set serviceaccount deployment.apps/oranges ex-280-sa

#oc get pods

#oc describe pod oranges-7849dcbd68-wqhhc | grep Labels

#oc get route

#oc get service

#oc describe service oranges

#oc describe service oranges | grep Selector

#oc edit service oranges

Spec🡪Selector 🡪 deployment:orange to deployment: oranges

#oc describe service oranges

#curl oranges.apps.ocp4.example.com

1. Deploy an Application

Deploy an application called voyager in the project path-finder

* 1. Don’t add any new configuration
  2. Application should produce an valid output

ANSWER:

#oc project path-finder

#oc get pods

#oc logs voyager-5b7bf5599-ds9m9

#oc describe pod voyager-5b7bf5599-ds9m9 | grep Node-Selector

#oc get nodes --show-labels

#oc get all | grep deploy

#oc edit deployment voyager or (copy and paste the exact deployment name)

spec 🡪template 🡪spec 🡪containers 🡪 node-selector 🡪 change Trek:star to trek:star

#oc get route

#oc get service

#oc describe route voyager-b7h44

#oc get ingress

#oc edit ingress voyager

spec 🡪rules 🡪host 🡪 change as voyager.apps.ocp4.example.com

only change “s” value on global exam but now you should change whole above url

#oc get route

#curl voyager.apps.ocp4.example.com

1. Deploy an Application

Deploy an application called mercury in the project atlas

* 1. Don’t add any new configuration
  2. Application should produce an valid output

ANSWER:

# oc project atlas

oc get all | grep deploy

oc set resources --requests memory=256Mi deployment.apps/mercury