[Kubernetes](https://quadralogics.moodlecloud.com/course/view.php?id=5" \l "section-13)

<https://kubernetes.io/docs/concepts/overview/components/>

TASK 1:HOW TO CREATE KUBERNETES CLUSTER – MINIKUBE WAY

<https://kubernetes.io/docs/concepts/overview/components/>

TASK 1:HOW TO CREATE KUBERNETES CLUSTER – MINIKUBE WAY

<https://kubernetes.io/docs/concepts/overview/components/>

1 Clone the Kubernetes repository

git clone <https://github.com/AnjuMeleth/DevOpsMasterKubernetesTasks.git>

2 Run the installation script in

<https://github.com/AnjuMeleth/DevOpsMasterKubernetesTasks/tree/master/1_installation>

1\_installation sub folder

sh minikube\_install.sh

3 Get the kubectl version

sudo kubectl version --client=true

4 Get the minikube version

sudo minikube version

Machine generated alternative text:
tting 
tting 
tting 
tting 
tting 
14 .4M 
51.3M 
39.8M 
79.5M 
up 
up 
up 
up 
up 
ocessnng 
ocessnng 
% Total 
ent 
o 
0 41.0M 
9M 
% Total 
ent 
o 
6 39.8M 
0 39.8M 
libsoup-gnome2 .4-1: amd64 (2.62 . I-lubuntuO.4) 
librest-O.7-O:amd64 (0.8.0-2) 
libgtk-3-O:amd64 (3.22 . 30-1ubuntu4) 
libgtk-3-bin (3.22 . 30-1ubuntu4) 
qt5-gtk-p1 atformtheme : amd64 (5 . 9. 5+dfsg-Oubuntu2 . 5) 
triggers for 
triggers for 
libgdk-pixbuf2 . 0-0: amd64 (2 . 36.11-2) 
libc-bin (2.27-3ubuntu1.2) 
o 
100 
o 
36 
100 
Recei ved 
o 
41.0M 
Recei ved 
o 
o 
o 
o 
o 
o 
Xferd 
o 
o 
Xferd 
o 
o 
o 
Average speed 
DI oad upl oad 
96.9M 
Average speed 
DI oad upl oad 
Ti me 
Total 
Ti me 
Total 
Ti me 
spent 
Ti me 
spent 
Ti me 
L eft 
Ti me 
L eft 
cu 
sp 
cu 
sp 

sudo kubectl version --client=true

Machine generated alternative text:
o 
o 
o 
o 
36 39.8M 
100 39.8M 
9.5M 
36 14.4M 
100 39.8M 
o 
o 
o 
o 
0 51.3M 
0 79.5M 
Obuntu@i p-172-31-75-162 : -/DevopsMasterKubernetesTasks/1_i nstal lati ons sudo 
kubectl version --client=true 
Client version: version .1nfo{Major: "1", Minor: "19", Gitversion : "VI. 19.2" , 
Gitcommit: "f5743093fd1c663cbOcbc89748f730662345d44d" , GitTreestate: "cl ean" 
, BuildDate: coversion: "gol.15" , 
compi ler : "gc" , 
tform: "1 i nux/amd64 
ubuntu@i p -172-31-7 5-162 : -/DevopsMasterKubernetesTasks /l_i nstal 1 ati on S 

sudo minikube version

Machine generated alternative text:
sud 
minikube version 
ninikube version: VI. 2.0 
'buntu@i p-172-31-75-162 : -/DevopsMasterKubernetesTasks/1_i nstal 1 ati ons 

Task 2:

TASK 2:HOW TO START A MINIKUBE CLUSTER

# Steps Commands

1 Start a Minikube cluster

sudo minikube start

2 Throws an error “Unable to start

VM as this computer doesn't have VT-X/AMD-v enabled”

3 Start Minikube with no driver

sudo minikube start --vm-driver=none

4 Throws an error “"docker":

executable file not found in

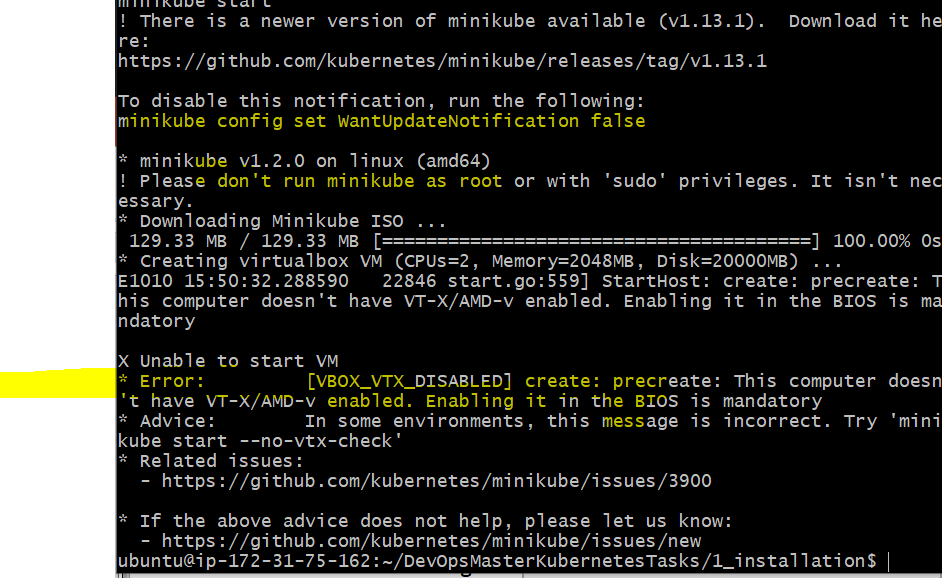
$PATH”. Install docker

sudo apt-get install docker.io

5 Start the minikube once again

sudo minikube start --vm-driver=none

Getting error:



sudo apt-get install docker.io

Machine generated alternative text:
group 
docker' (GID 
)one. 
:reated symlink /etc/systemd/system/sockets . target . wants/docker . socket 
b/systemd/system/docker . socket . 
locker.service is a disabled or a static unit, not starting it. 
'rocessing triggers for systemd (237-3ubuntu10.42) 
'rocessing triggers for man-db (2.8. 3-2ubuntuO.1) 
•rocessing triggers for ureadahead (O. 100.0-21) 
Ibuntu@i p-172-31-75-162 : -/DevopsMasterKubernetesTasks/1_i nstal 1 ati ons 

sudo minikube start --vm-driver=none

// now it working

Machine generated alternative text:
sudo minikube 
start --vm-dri ver=none 
* minikube VI. 2.0 on linux (amd64) 
* creating none VM (CPUs=2, Memory=2048MB, Disk=20000MB) 
* configuring envi ronment for Kubernetes VI. 15.0 on Docker 19.03.6 
- kubel et . resol v-conf=/run/systemd/resol ve/resolv. conf 
* Downloading kubeadm VI. 15 .0 
Downloading kubelet VI. 15 .0 
pulling images 

TASK 3:HOW TO DEPLOY AN APPLICATION ON MINIKUBE CLUSTER USING PODS

1 Run a pod on the minikube cluster

sudo kubectl run nginx --image=nginx --port=80

2 View the pods

sudo kubectl get pods

sudo kubectl run nginx --image=nginx --port=80

Machine generated alternative text:
sudo kubec 
t 1 run nginx 
--port=80 
--7 mage=ngn nx 
pod/nginx created 
ubuntu@i p-172-31-75-162 : -/DevopsMasterKubernetesTasks/1_i nstal lati ons 

sudo kubectl get pods

Machine generated alternative text:
ubuntu@ip-172-31-75-162:-/DevopsMasterKubernetesTasks/1_insta11ationS sudo kubec 
t 1 run nginx 
--port=80 
--7 mage=ngn nx 
pod/nginx created 
ubuntu@i p-172-31-75-162 . 
•-/DevopsMasterKubernetesTasks/1_insta11ationS sudo kubec 
X 1 get pods 
NAME 
READY STATUS 
ngi n x 1/1 
Running 
.ubuntu@i P-172-31-7 5-162 . 
RESTARTS 
AGE 
57s 
•-/DevopsMasterKubernetesTasks/1_insta11ationS 

sudo kubectl describe pod/nginx

Machine generated alternative text:
p-172-31-7 5-165. 
•-/DevopsMasterKubernetesTasks/1_insta11ationS sudo kubec 
t 1 describe pod/nginx 
Name : 
Namespace : 
ority: 
Node : 
Start Ti me: 
Labels: 
Annotati ons : 
Status : 
IPs: 
contai ners : 
ngnnx: 
contai ner 
1b2781325f7fe 
Image : 
Image ID: 
ngnnx 
default 
mini kube/172 . 31.75 .162 
sat, 10 oct 2020 16:19:38 +0000 
run=ngn nx 
<none> 
Running 
172 .17 . 0.4 
<none> 
ID: 
docker://bd4505a03cOa1ed5b94f4e6e3952b6dc9e8757c8c6083770f7z 
ngnnx 
docker-pul 1 abl e : //ngi nx@sha256 : fc66cdef5ca33809823182c9c5d7 
ea86fd2cef7713cf3363e1aOb12a5d77500 
port : 
Host port: 
State : 
Started : 
Ready : 
Restart count: 
Envi ronment : 
Mounts : 
80/TCP 
O/TCP 
Running 
sat, 10 oct 2020 16:19:43 +0000 
True 
<none> 

Machine generated alternative text:
State: 
Started : 
Ready : 
Restart count: 
Envi ronment : 
Mounts : 
Running 
sat, 10 oct 2020 16:19:43 +0000 
True 
<none> 
/var/run/secrets/kubernetes .io/servi ceaccount from default-token-jn91s 
conditi ons : 
Type 
Initialized 
Ready 
contai nersReady 
podschedul ed 
Evol umes : 
Status 
True 
True 
True 
True 
default-token-jn91s: 
Type : 
secretName : 
opti onal : 
QOS Class: 
Node-sel ectors : 
ETOI erati ons : 
secret (a volume populated by a secret) 
default-token-jn91s 
false 
BestEffort 
<none> 
node.kubernetes .io/not-ready:N0Execute op=Exists for 300s 
node.kubernetes .io/unreachab1e:N0Execute op=Exists for 300s 
Events : 
Type 
Normal 
Reason 
schedul ed 
nx to minikube 
Normal 
Normal 
Normal 
pulling 
pulled 
created 
Age 
4m37s 
4m36s 
4m33s 
4m33s 
F r 0m 
default-scheduler 
kubel et 
kubel et 
kubel et 
Message 
successfully assigned default/ngi 
pulling image "nginx" 
successfully pulled image "nginx" 
created container nginx 

TASK 4:HOW TO ACCESS AN APPLICATION RUNNING IN A POD FROM OUTSIDE

1 Create a NodePort service

sudo kubectl expose pod nginx --type=NodePort

2 List the services

sudo kubectl get services

3 Access the server from thebrowser

http://<Ip address of thesystem>:port

3.234.214.32

<http://3.234.214.32:32014>

//port no take from sudo kubectl get services and node port

4 Delete the service

sudo kubectl delete svc nginx

5 Stop the Minikube cluster

sudo minikube stop

6 Delete the Minikube cluster

sudo minikube delete

7 Delete the config file

sudo rm -rf ~/.kube/config

8 Delete the kubernetes

rm -rf /etc/kubernetes

1 Create a NodePort service

sudo kubectl expose pod nginx --type=NodePort

2 List the services

sudo kubectl get services

Machine generated alternative text:
ubuntu@i P-172 -31-7 5-162 : -/DevopsMasterKubernetesTasks /l_i nstal 1 ati on S 
t 1 expose pod nginx --type=N0deport 
servi ce/nginx exposed 
ubuntu@i P-172-31-7 5-162 . 
• -/DevopsMasterKubernetesTasks /l_i nstal 1 ati on S 
t 1 get servi ces 
NAME 
TYPE 
kubernetes 
Cl uster1P 
N0deport 
ngnnx 
ubuntu@i p-172-31-75-162 . 
CLUSTER-IP 
10.96.0.1 
10 . 98 . 201. 202 
EXTERNAL-IP 
<none> 
<none> 
PORT(S) 
443/TCP 
80 : 32014/TCP 
sudo kubec 
sudo kubec 
AGE 
34m 
23s 
• -/DevopsMasterKubernetesTasks/1_i nstal 1 ati on S 

2 List the services

sudo kubectl get services

3 Access the server from thebrowser

http://<Ip address of thesystem>:port

3.234.214.32

<http://3.234.214.32:32014>

//port no take from sudo kubectl get services and node port

Machine generated alternative text:
Not secure 
Apps 
A 
server 
| 3.234.214.32:32014 
Imported From IE 
Imported 
Bookmarks bar 
DevApp 
Welcome to nginx! 
If you see this page, the nginx web server is successfully installed and 
working. Further configuration is required. 
For online documentation and support please refer to nginx.org. 
Commercial support is available at nginx.com. 
Thank you for using nginx. 

git clone <https://github.com/AnjuMeleth/DevOpsMasterKubernetesTasks.git>

task : 5:

TASK 5:HOW TO ESTABLISH PASSWORD LESS CONNECTIVITY ACROSS INSTANCES GOING TO BE USED AS MANAGER AND WORKER NODES FOR COMMUNICATION

1 Transfer the .pem file to

Kubernetes manager node using Filezilla

2 Stop all firewall

sudo service ufw stop

3 Start ssh

sudo service ssh start

C:\Users\cjerome\devapp\hello\WorkBook\WorkBook\_Content\AWS

4 Add the ssh details

eval `ssh-agent -s`

sudo chmod 400 Jenkins.pem

ssh-add Jenkins.pem

5 Access the node system frommaster

ssh ubuntu@<IP address> //of node

ssh ubuntu@3.238.112.85

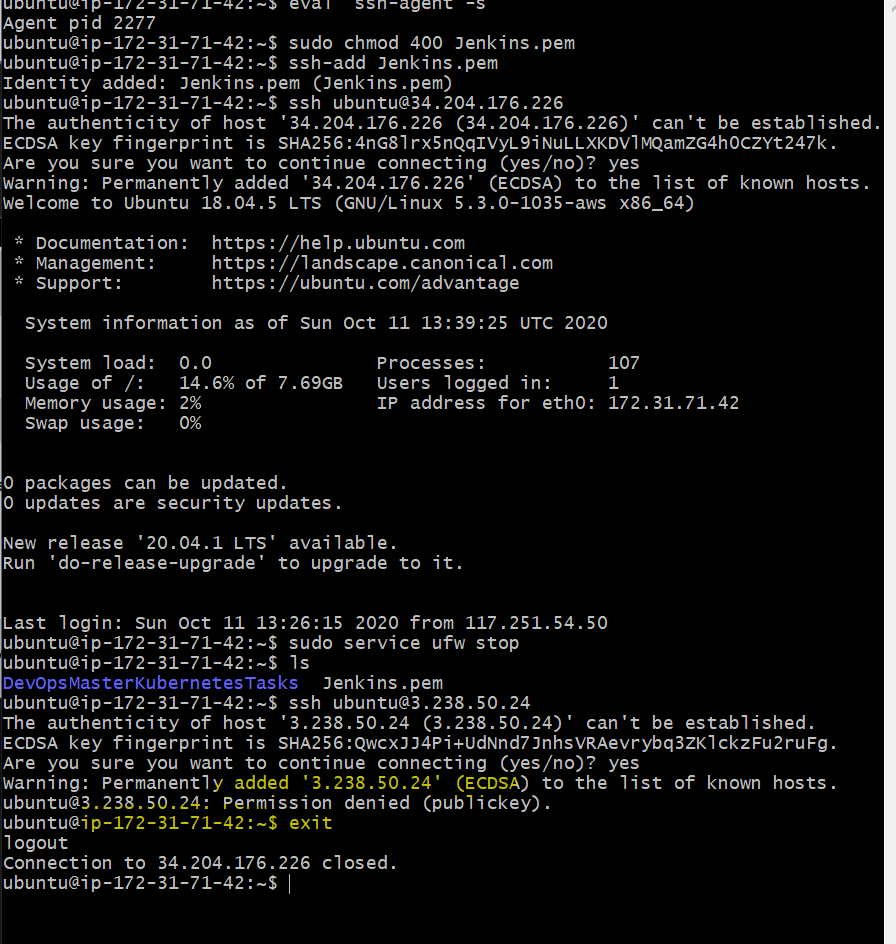
6 Stop all firewall

sudo service ufw stop

7. exit

// out cout from node and now in master;

Machine generated alternative text:
ubuntu@i p-172-31-71-42 . 
• -S eval •ssh-agent -s 
Agent pid 2277 
ubuntu@ip-172-31-71-42 
: -S sudo chmod 400 Jenkins . pem 
ubuntu@i p-172-31-71-42 . 
• -S ssh-add Jenkins . pem 
Identity added: Jenkins . pem (Jenkins .pem) 
ubuntu@i P-172-31-71-42 : -S 



TASK 6 :HOW TO BRING UP A KUBERNETES MASTER IN A PRODUCTION CLUSTER USING KUBEADM

1 Modify the hostname in

Kubernetes manager node

sudo vi /etc/hostname

2 Enter the Kubernetes master and

node details in /etc/hosts file of

the master

sudo vi /etc/hosts

sudo vi /etc/hosts //node

Installation in master

3 Run the installation script

sh kubeadm\_install.sh

4 Edit the file

/etc/systemd/system/kubelet.service.d/10-kubeadm.conf with thecontent

sudo nano /etc/systemd/system/kubelet.service.d/10-kubeadm.conf

Environment="cgroupdriver=systemd/cgroupdriver=cgroupfs"

5 Initialise the Kubernetes cluster by

advertising the master IP address.

Make a note of the output details

sudo kubeadm init --pod-network-cidr=10.244.0.0/16

Machine generated alternative text:
unpacki ng 
sel ecti ng 
prepari ng 
unpacki ng 
sel ecting 
prepari ng 
unpacki ng 
socat (1.7. 
previ ously 
to unpack 
kubelet (1. 
previ ously 
to unpack 
kubeadm (1. 
setting up conntrack 
3.2-2ubuntu2) 
unselected package kubelet. 
.. /4-kube1 et_l. 19 .2-00_amd64. deb 
19 . 2-00) 
unsel ected package kubeadm. 
.. /5-kubeadm_1.19.2-00_amd64. deb 
19 . 2-00) 
(1 : 1.4 .4+snapshot20161117 -6ubuntu2) 
setting up kubernetes-cni (0.8.7-00) 
'Setting up cri -tools (1.13.0-01) 
setting up socat (1.7. 3.2-2ubuntu2) 
setting up kubelet (1.19.2-00) 
created symlink /etc/systemd/system/multi-user . target . wants/kubelet.service / 1 
i b/systemd/system/kubel et . servi ce . 
setting up kubeadm (1.19.2-00) 
processing triggers for man-db (2 . 8. 3-2ubuntuO.1) 
ubuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS 

sudo nano /etc/systemd/system/kubelet.service.d/10-kubeadm.conf

Environment="cgroupdriver=systemd/cgroupdriver=cgroupfs"

Machine generated alternative text:
etc/systemd system kubelet.service.d 
10-kubeadm . conf 
Note: This dropin only works with kubeadm and kubelet 
[Servi cel 
VI. 11+ 
En vi ron ment=" KUBEL rap -kubeconfi g=/etc/kube rn etes [boo $ 
Envi ronment="KUBELET_CONFIG_ARGS=--confi g=/var/l i b/kubel et/confi g . yaml " 
Envi ronment=" cgroupdri ver=systemd/cgroupdri ver=cgroupfs " 
# This is a file that "kubeadm init" and "kubeadm join" generates at runtime, ps 
Envi ronmentFi 1 e=-/var/l i b/kubel et/kubeadm-fl ags . env 
# This is a file that the user can use for overrides of the kubelet args as a IS 
# the .N0deRegistration .Kube1etExtraArgs object in the configuration files inst$ 
Envi ronmentFi 1 e=-/etc/defaul t/kubel et 
Execstart= 
Execstart=/usr/bin/kubelet SKUBEL$ 

// The below all copy and paste in a notepad and run command one by one

To start using your cluster, you need to run the following as a regular user:

mkdir -p $HOME/.kube

sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config

sudo chown $(id -u):$(id -g) $HOME/.kube/config

sudo kubectl get pods -o wide --allnamespaces

You should now deploy a pod network to the cluster.

Run "kubectl apply -f [podnetwork].yaml" with one of the options listed at:

<https://kubernetes.io/docs/concepts/cluster-administration/addons/>

Then you can join any number of worker nodes by running the following on each as root:

kubeadm join 172.31.69.146:6443 --token d7lv9u.g7hoeri3rdd0hjra \

--discovery-token-ca-cert-hash sha256:4fc9d78bdb355d399bd9a413937cf44d73579679eec0c8a25499c234a3573231

Machine generated alternative text:
ubuntu@master : -/DevopsMasterKubernetesTasks/1_i nstal 1 ati on S 
ubuntu@master : -/DevopsMasterKubernetesTasks /l_i nstal 1 ati on S 
rnetes/admin . conf SHOME/. kube/config 
ubuntu@master : -/DevopsMasterKubernetesTasks /l_i nstal 1 ati on S 
SC id -g) SHOME/ .kube/config 
ubuntu@master : -/DevopsMasterKubernetesTasks /l_i nstal 1 ati on S 
mkdir -p SHOME/ .kube 
sudo cp -i /etc/kube 
sudo chown SC id -u): 

// need to run below 3 commands.

mkdir -p $HOME/.kube

sudo cp -i /etc/kubernetes/admin.conf $HOME/.kube/config

sudo chown $(id -u):$(id -g) $HOME/.kube/config

--------------------------------------

continue task 6:

Machine generated alternative text:
ubuntu@master : -/DevopsMasterKubernetesTasks /l_i nstal 1 ati on S 
ubuntu@master : -/DevopsMasterKubernetesTasks /l_i nstal 1 ati on S 
rnetes/admin . conf SHOME/. kube/config 
ubuntu@master : -/DevopsMasterKubernetesTasks /l_i nstal 1 ati on S 
S(id -g) SHOME/ .kube/config 
mkdir -p SHOME/. kube 
sudo cp -i /etc/kube 
sudo chown SC id -u): 

7 List the pods

kubectl get pods -o wide --all-namespaces

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TASK 7:HOW TO ADD A

WORKER NODE TO

KUBERNETES CLUSTER

1 Make sure you have the right

hostname details in /etc/hosts file

and /etc/hostname files

sudo vi /etc/hostname

sudo vi /etc/hosts //master nad node

git clone <https://github.com/AnjuMeleth/DevOpsMasterKubernetesTasks.git>

2 Run the installation script sh kubeadm\_install.sh

3 Edit the file

/etc/systemd/system/kubelet.service.d/10-kubeadm.conf with the content

sudo nano /etc/systemd/system/kubelet.service.d/10-kubeadm.conf

Environment="cgroupdriver=systemd/cgroupdriver=cgroupfs"

4 Run the join token command

received during the kubeadm init

command

sudo kubeadm join <>--token

<token>

sudo kubeadm join 172.31.71.42:6443 --token 2n1jgv.nnmge7i2xqbca45x \

--discovery-token-ca-cert-hash sha256:9959669cc22369957b14fd810af37217476d9fef17ffdc2e65d39daaa53d90d6

5 Get the list of nodes in the

Kubernetes master

kubectl get nodes

Machine generated alternative text:
ubuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS kubectl get pods -o 
wide --al I-namespaces 
NAMESPACE 
kube-system 
<none> 
kube-system 
<none> 
kube-system 
172.31. 71.42 
kube-system 
172.31. 71.42 
kube-system 
172.31. 71.42 
kube-system 
172.31. 71.42 
kube-system 
172.31. 71.42 
NAME 
NODE 
NOMINATED NODE 
READY STATUS 
READINESS GATES 
RESTARTS 
coredns -f9fd979d6-d5d84 
0/1 
<none> 
<none> 
<none> 
coredns -f9fd979d6-fsv1 g 
0/1 
<none> 
<none> 
<none> 
etcd-master 
1/1 
master 
<none> 
<none> 
kube-apiserver-master 
1/1 
master 
<none> 
<none> 
kube-control 1 er-manager-master 1/1 
master 
<none> 
<none> 
kube-proxy-5x8x1 
1/1 
master 
<none> 
<none> 
kube-scheduler-master 
1/1 
master 
<none> 
<none> 
pendi ng 
pendi ng 
Running 
Running 
Running 
Running 
Running 
AGE 
17m 
17m 
17m 
17m 
17m 
17m 
17m 
ubuntu@master : -/DevopsMasterKubernetesTasks/1_i nstal lati ons 

Machine generated alternative text:
ubuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS kubectl apply -f htt 
ps : //raw. gi thubusercontent . com/coreos/fl annel /2140ac876ef134eOed5af15c65e414cf26 
827915 [Documentati on/kube-fl annel . yml 
podsecuritypol icy. pol icy/psp . fl annel . unprivi leged created 
warning: rbac.authorization .k8s .io/vlbetal ClusterR01e is deprecated in VI. 17+, 
unavailable in VI .22+; use rbac.authorization .k8s .io/vl ClusterR01e 
clusterrole. rbac.authorization .k8s .io/fl annel created 
warning: rbac.authorization .k8s .io/vlbetal ClusterR01eBinding is deprecated in v 
1.17+, unavailable in VI .22+; use rbac.authorization .k8s .io/vl ClusterR01eBindin 
clusterrolebinding. rbac.authorization .k8s .io/flannel created 
servi ceaccount/fl annel created 
Iconfi gmap/kube-fl annel -cfg created 
'daemonset . apps/kube-fl annel -ds -amd64 created 
daemonset . apps/kube-fl annel -ds-arm64 created 
daemonset . apps/kube-fl annel -ds -arm created 
daemonset . apps/kube-fl annel -ds-ppc641e created 

Machine generated alternative text:
10 . 244.0. 2 
master 
<none> 
ube-system 
etcd-master 
172. 31. 71. 
42 master 
<none> 
ube-system 
kube-apiserver-master 
172. 31. 71. 
42 master 
<none> 
ube-system 
172. 31. 71. 
ube-system 
172. 31. 71. 
ube-system 
172. 31. 71. 
ube-system 
172.31. 71.42 
<none> 
1/1 
<none> 
1/1 
<none> 
kube-control 1 er-manager-master 1/1 
42 master 
<none> 
kube-fl annel -ds -amd64-gj rk8 
42 master 
<none> 
kube-proxy-5x8x1 
42 master 
<none> 
kube-scheduler-master 
master 
<none> 
<none> 
1/1 
<none> 
1/1 
<none> 
1/1 
<none> 
Running 
Running 
Running 
Running 
Running 
Running 
23m 
23m 
23m 
78s 
22m 
23m 
Ibuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS sudo nano /etc/syste 
Id/system/kubel et . servi ce . d/10-kubeadm. conf 
Ibuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS sudo nano /etc/syste 
Id/system/kubel et . servi ce . d/10-kubeadm. conf 
Ibuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS kubectl get pods -o 
lide --al I-namespaces 
IAMESPACE 
NAME 
NODE 
ube-system 
10.244.0.3 
ube-system 
10 . 244.0. 2 
ube-system 
172.31. 71.42 
ube-system 
172.31. 71.42 
ube-system 
172.31. 71.42 
ube-system 
172.31. 71.42 
ube-system 
172.31.69.155 
ube-system 
172.31. 71.42 
ube-system 
172.31.69.155 
ube-system 
172.31. 71.42 
NOMINATED NODE 
READY STATUS 
READINESS GATES 
RESTARTS 
coredns -f9fd979d6-d5d84 
master 
<none> 
coredns -f9fd979d6-fsv1 g 
master 
<none> 
etcd-master 
master 
<none> 
kube-apiserver-master 
master 
<none> 
1/1 
<none> 
1/1 
<none> 
1/1 
<none> 
1/1 
<none> 
kube-control 1 er-manager-master 1/1 
master 
<none> 
kube-fl annel -ds -amd64-gj rk8 
master 
<none> 
kube-fl annel -ds -amd64-hpzh1 
knode 
<none> 
kube-proxy-5x8x1 
master 
<none> 
kube-proxy-qqqkt 
knode 
<none> 
kube-scheduler-master 
master 
<none> 
<none> 
1/1 
<none> 
1/1 
<none> 
1/1 
<none> 
1/1 
<none> 
1/1 
<none> 
Running 
Running 
Running 
Running 
Running 
Running 
Running 
Running 
Running 
Running 
AGE 
34m 
34m 
34m 
34m 
34m 
12m 
31s 
34m 
31s 
34m 
Ibuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS sudo nano /etc/syste 
Id/system/kubel et . servi ce . d/10-kubeadm. conf 
Ibuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS kubectl get nodes 
AME 
node 
laster 
STATUS ROLES 
AGE VERSION 
Ready 
73S VI. 19 .2 
Ready 
35m VI. 19.2 
master 
Ibuntu@master : -/DevopsMasterKubernetesTasks/1_i nstal lati ons 

sudo kubeadm join <>--token

<token>

sudo kubeadm join 172.31.71.42:6443 --token 2n1jgv.nnmge7i2xqbca45x \

--discovery-token-ca-cert-hash sha256:9959669cc22369957b14fd810af37217476d9fef17ffdc2e65d39daaa53d90d6

5 Get the list of nodes in the

Kubernetes master

kubectl get nodes

Machine generated alternative text:
kubectl 
get nodes 
\IAME 
(node 
naster 
STATUS ROLES 
AGE VERSION 
Ready 
73S VI. 19 .2 
Ready 
35m VI. 19.2 
master 
'buntu@master : -/DevopsMasterKubernetesTasks/1_i nstal lati ons 

-------------------

TASK 8: HOW TO DEPLOY AN APPLICATION POD ON KUBERNETES CLUSTER AND ACCESS IT

1 Run a pod on the cluster

sudo kubectl run nginx --image=nginx --port=80

2 View the pods

sudo kubectl get pods

3 Create a NodePort service

sudo kubectl expose pod nginx --type=NodePort

4 List the services

sudo kubectl get svc

5 Access the server from the browser

http://< Correct Ip address of the system>:port

6 Get more details about the pods

kubectl describe pods nginx

7 Delete the service

sudo kubectl delete svc nginx

8 Delete pods

kubectl delete pods nginx

Machine generated alternative text:
ubuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS sudo kubectl 
--port=80 
x --7 mage=ngnnx 
pod/nginx created 
ubuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS sudo kubectl 
run ngl 
get pod 
NAME 
ngnnx 
READY 
1/1 
STATUS 
Running 
RESTARTS 
AGE 
42s 
ubuntu@master . 
•-/DevopsMasterKubernetesTasks/1_insta11ationS 

Machine generated alternative text:
sudo kubectl 
nx --7 mage=ngnnx --port=80 
pod/nginx created 
ubuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS sudo kubectl 
NAME 
ngnnx 
READY 
1/1 
STATUS 
Running 
RESTARTS 
AGE 
42s 
ubuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS sudo kubectl 
pod nginx --type=N0deport 
servi ce/nginx exposed 
ubuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS sudo kubectl 
s 
NAME 
ngnnx 
READY 
1/1 
STATUS 
Running 
RESTARTS 
AGE 
92s 
ubuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS sudo kubectl 
run ngl 
get pod 
expose 
get pod 
get svc 
NAME 
kubernetes 
ngnnx 
TYPE 
Cl uster1P 
N0deport 
CLUSTER-IP 
10.96.0.1 
10. 96.167 .212 
PORT(S) 
EXTERNAL -IP 
<none> 
<none> 
443/TCP 
80: 31222/TCP 
AGE 
45m 
22s 
ubuntu@master : -/DevopsMasterKubernetesTasks/1_i nstal lati ons 

Master o/p

Machine generated alternative text:
| 34.204.176.226:31222 
Imported From IE 
Imported 
Bookmarks bar 
DevApp 
Welcome to nginx! 
If you see this page, the nginx web server is successfully installed and 
working. Further configuration is required. 
For online documentation and support please refer to nginx.org. 
Commercial support is available at nginx.com. 
Thank you for using nginx. 

Slave o/p

Machine generated alternative text:
A Not secure 
•rver 
3.238.50.24:31222 
Imported From IE 
Imported 
Bookmarks bar 
DevApp 
Welcome to nginx! 
If you see this page, the nginx web server is successfully installed and 
working. Further configuration is required. 
For online documentation and support please refer to nginx.org. 
Commercial support is available at nginx.com. 
Thank you for using nginx. 

Machine generated alternative text:
nnotati ons : 
Running 
.tatus : 
10.244. 1.2 
IP: 10.244.1 2 
:ontai ners : 
ngnnx: 
contai ner 
e4fff5af4f14 
Image : 
Image ID: 
ID: 
docker: //5d251adOfb6d3a790338c29110c528c28163fadf5eef30a4904 
ngnnx 
docker-pul 1 abl e : //ngi nx@sha256 : fc66cdef5ca3380982 3182c9c5d72 
a86fd2cef7713cf3363e1aOb12a5d77500 
port : 
Host port: 
State : 
Started : 
Ready : 
Restart count: 
Envi ronment : 
Mounts : 
80/TCP 
O/TCP 
Running 
sun, 11 oct 2020 +0000 
True 
<none> 
/var/run/secrets/kubernetes .io/servi ceaccount from default-token-hx7fc 
:onditi ons : 
Type 
Initialized 
Ready 
contai nersReady 
podschedul ed 
'01 umes : 
Status 
True 
True 
True 
True 
default-token-hx7fc: 
Type : 
secretName : 
opti onal : 
IOS Class: 
ode-sel ectors : 
•olerati ons : 
secret (a volume populated by a secret) 
default-token -hx7fc 
false 
BestEffort 
<none> 
node.kubernetes .io/not-ready:N0Execute op=Exists for 300s 
node.kubernetes .io/unreachab1e:N0Execute op=Exists for 300s 
vents : 
Type 
Normal 
Reason 
schedul ed 
x to knode 
Normal pulling 
Normal pul led 
in 2.966871805s 
Normal created 
Normal Started 
Age 
4m59s 
4m58s 
4m55s 
4 m 54 s 
4 m 54 s 
F r 0m 
default-scheduler 
kubel et 
kubel et 
kubel et 
kubel et 
Message 
successfully assigned default/ngi 
pulling image "nginx" 
successfully pulled image "nginx" 
created container nginx 
Started container nginx 
buntu@master : -/DevopsMasterKubernetesTasks/1_i nstal lati ons 

6 Get more details about the pods

kubectl describe pods nginx

7 Delete the service

sudo kubectl delete svc nginx

8 Delete pods

kubectl delete pods nginx

Machine generated alternative text:
ubuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS sudo kubectl delete 
svc ngnnx 
servnce "ngnnx" 
del eted 
ubuntu@master:-/DevopsMasterKubernetesTasks/1_insta11ationS kubectl delete pods 
ngnnx 
pod "nginx" deleted 
ubuntu@master : -/DevopsMasterKubernetesTasks/1_i nstal lati ons 

**Task 9: home work**

TASK 9 : HOW TO DEPLOY A POD ON KUBERNETES CLUSTER AND ACCESS IT USING KUBECTL

1 Run a pod on the cluster

sudo kubectl run apache --image=httpd --port=80

2 View the pods

sudo kubectl get pods

3 Create aNodePort service

sudo kubectl expose pod apache --type=NodePort

4 List the services

sudo kubectl get svc

5 Access the server from the browser

http://< Correct Ip address of the system>:port

31124

http://< Correct Ip address of the system>:port

Master

34.204.176.226

<http://34.204.176.226:31124>

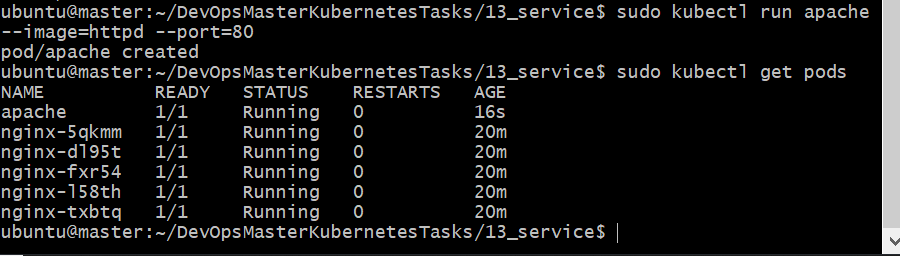
Slave

3.238.50.24

<http://3.238.50.24:31124>

6 Get more details aboutthe pods

kubectl describe pods apache



Machine generated alternative text:
ubuntu@master : -/DevopsMasterKubernetesTasks /13_servi ces 
NAME 
READY 
apache 
1/1 
nginx-5qkmm 
1/1 
ngi nx-dl 95t 
1/1 
ngi nx-fxr54 
1/1 
ngi nx-1 58th 
1/1 
ngi nx-txbtq 
1/1 
apache --type=N0deport 
STATUS 
Running 
Running 
Running 
Running 
Running 
Running 
RESTARTS 
AGE 
71s 
21m 
21m 
21m 
21m 
21m 
: -/Devops MasterKubernetesTas ks /13_servi ces 
servi ce/apache exposed 
ubuntu@master : -/Devops MasterKubernetesTasks /13_s ervi ces 
NAME 
apache 
kubernetes 
my-servi ce 
TYPE 
N0deport 
Cl uster1P 
N0deport 
CLUSTER-IP 
10 . 102 . 198 . 109 
10.96.0.1 
10 . 103.203.4 
EXTERNAL -IP 
<none> 
<none> 
sudo kubectl 
sudo kubectl 
sudo kubectl 
PORT(S) 
80 : 31124/TCP 
443/TCP 
80 : 30007 [TCP 
get pods 
expose pod 
get svc 
AGE 
22s 
140m 
28m 
ubuntu@master : -/Devops MasterKubernetesTas ks /13_servi ces 

5 Access the server from the browser

http://< Correct Ip address of the system>:port

31124

http://< Correct Ip address of the system>:port

Master

34.204.176.226

<http://34.204.176.226:31124>

Slave

3.238.50.24

<http://3.238.50.24:31124>

6 Get more details aboutthe pods

kubectl describe pods apache

Machine generated alternative text:
Not secure 
Apps 
server 
34.204.176.226.•31 124 
[A Imported From IE 
Imported 
It works! 

Machine generated alternative text:
Not secure 
Apps 
server 
3.238.50.24.•31 124 
Imported From IE 
Imported 
It works! 

Task 10:

TASK 10 : HOW TO DEPLOY A POD ON KUBERNETES CLUSTER USING YML

<https://github.com/AnjuMeleth/DevOpsMasterKubernetesTasks.git>

# Steps Commands

1 Create ngin\_pod.yml

sudo vi nginx\_pod.yml

2 Apply the yml

kubectl apply -f nginx\_pod.yml

3 Get the list of pods running

kubectl get pods

4 Delete the pods

kubectl delete pods mypod

Task10:

Machine generated alternative text:
ubuntu@master : -/Devops MasterKubernetesTasks /10_podS 
commands . txt 
ngi nx_pod . yml 
ubuntu@master : -/Devops MasterKubernetesTasks /10_podS 
ml 
pod/mypod created 
ubuntu@master : -/DevopsMasterKubernetesTasks /10_podS 
NAME 
READY STATUS 
RESTARTS 
mypod 1/1 
Running 
AGE 
72s 
kubectl 
kubectl 
kubectl 
apply -f nginx_pod.y 
get pods 
del ete pods mypod 
ubuntu@master : -/Devops MasterKubernetesTasks /10_podS 
pod "mypod" del eted 
ubuntu@master : -/Devops MasterKubernetesTasks /10_podS 

Task 11

TASK 11:HOW TO CREATE A REPLICATION CONTROLLER

1 Edit the nginx\_rc.yml file in 11\_rc folder

vi nginx\_rc.yml

2 Apply the yml file

kubectl apply -f nginx\_rc.yml

3 List the replication controller

kubectl get rc

4 Get the list of pods

kubectl get pods

5 Get the details about the replication controller created

kubectl describe replicationcontrollers/nginx

6 To list only the pods under the replication controller

pods=$(kubectl get pods --selector=app=nginx --output=jsonpath={.items..metadata.name})

echo $pods

Machine generated alternative text:
ubuntu@master:-/DevopsMasterKubernetesTasks/10_podS cd 
ubuntu@master:-/DevopsMasterKubernetesTasksS cd Il_rc/ 
ubuntu@master : -/Devops MasterKubernetesTasks /11_rcS 
ubuntu@master : -/DevopsMasterKubernetesTasks /11_rcS 
replicationcontroller/nginx created 
ubuntu@master : -/DevopsMasterKubernetesTasks /11_rcS 
vi nginx_rc.yml 
kubectl apply -f nginx_rc.yml 
kubectl get rc 
NAME 
DESIRED 
3 
ngnnx 
CURRENT 
3 
READY 
3 
AGE 
12s 
ubuntu@master : -/DevopsMasterKubernetesTasks /11_rcS 

Machine generated alternative text:
ubuntu@master:-/DevopsMasterKubernetesTasks/11_rcS kubectl 
NAME 
nginx-fv259 
ngi nx-k89dk 
nginx-n47c5 
READY 
1/1 
1/1 
1/1 
STATUS 
RESTARTS 
Running 
Running 
Running 
AGE 
51s 
51s 
51s 
ubuntu@master:-/DevopsMasterKubernetesTasks/11_rcS kubectl 
ontrol lers/ngi nx 
get pods 
describe replicationc 
Name : 
Namespace : 
sel ector: 
Labels: 
Annotati ons : 
Repl i cas : 
pods Status: 
pod Template: 
ngnnx 
default 
app=ngn nx 
app=ngn nx 
<none> 
3 current / 3 desired 
3 Running / O waiting / O succeeded / O Failed 
Labels: 
app=ngn nx 
contai ners : 
ngnnx: 
Image : 
port : 
Host port: 
Envi ronment : 
Mounts : 
VOI umes : 
ngnnx 
80/TCP 
O/TCP 
<none> 
<none> 
<none> 
Events : 
Type 
Normal 
dk 
Normal 
59 
Normal 
Reason 
successful create 
successful create 
successful create 
Age 
65s 
65s 
65s 
repl i cati on-control ler 
repl i cati on-control ler 
repl i cati on-control ler 
Message 
created pod: 
created pod: 
created pod: 
ngi nx-k89 
ngi nx-fv2 
ngi nx-n47 
ubuntu@master : -/DevopsMasterKubernetesTasks /11_rcS 

6 To list only the pods under the replication controller

pods=$(kubectl get pods --selector=app=nginx --output=jsonpath={.items..metadata.name})

echo $pods

Machine generated alternative text:
ubuntu@master:-/DevopsMasterKubernetesTasks/11_rcS pods=S(kubect1 get pods --sel 
nx 
--output=jsonpath={ . items .. metadata. name}) 
ubuntu@master:-/DevopsMasterKubernetesTasks/11_rcS echo Spods 
nginx-fv259 nginx-k89dk nginx-n47c5 
ubuntu@master:-/DevopsMasterKubernetesTasks/11_rcS 

TASK 12:HOW TO SCALE AN APPLICATION IN A KUBERNETES CLUSTER

1.Scale the application to run 5instances

kubectl scale replicationcontrollers/nginx --replicas=5

2 List the rc

kubectl get rc

3 List the pods

kubectl get pods

Machine generated alternative text:
ubuntu@master:-/DevopsMasterKubernetesTasks/11_rcS kubectl 
rol lers/nginx 
--repl i cas=5 
replicationcontroller/nginx scaled 
ubuntu@master:-/DevopsMasterKubernetesTasks/11_rcS kubectl 
NAME 
DESIRED 
CURRENT 
5 
READY 
5 
AGE 
7m38s 
scale replicationcont 
get rc 
get pods 
5 
ngnnx 
NAME 
ngi nx-2kxvv 
ngi nx-fv259 
ngi nx-k89dk 
ngi nx-12cpp 
nginx-n47c5 
ubuntu@master . 
ubuntu@master:-/DevopsMasterKubernetesTasks/11_rcS kubectl 
READY 
1/1 
1/1 
1/1 
1/1 
1/1 
STATUS 
Running 
Running 
Running 
Running 
Running 
RESTARTS 
AGE 
115s 
7m54s 
7m54s 
115s 
7m54s 
• -/DevopsMasterKubernetesTasks/11_rcS 

ubuntu@master:~/DevOpsMasterKubernetesTasks/11\_rc$ echo $pods

nginx-fv259 nginx-k89dk nginx-n47c5

ubuntu@master:~/DevOpsMasterKubernetesTasks/11\_rc$ kubectl scale replicationcontrollers/nginx --replicas=5

replicationcontroller/nginx scaled

ubuntu@master:~/DevOpsMasterKubernetesTasks/11\_rc$ kubectl get rc

NAME DESIRED CURRENT READY AGE

nginx 5 5 5 7m38s

ubuntu@master:~/DevOpsMasterKubernetesTasks/11\_rc$ kubectl get pods

NAME READY STATUS RESTARTS AGE

nginx-2kxvv 1/1 Running 0 115s

nginx-fv259 1/1 Running 0 7m54s

nginx-k89dk 1/1 Running 0 7m54s

nginx-l2cpp 1/1 Running 0 115s

nginx-n47c5 1/1 Running 0 7m54s

ubuntu@master:~/DevOpsMasterKubernetesTasks/11\_rc$

-----------------

TASK 13 : HOW TO ACCESS AN APPLICATION FROM OUTSIDE

1 Edit the nginx\_service.yml in 13\_service folder

vi nginx\_service.yml

2 Apply the yml

kubectl apply -f nginx\_service.yml

3 Get the list of services

kubectl get svc

4 Access the Nginx application in port 8080

http://<Ip address>:port

<http://34.204.176.226>:

Master

34.204.176.226

Slave

3.238.50.24

Machine generated alternative text:
ubuntu@master : -/Devops MasterKubernetesTasks /13_servi ces 
ubuntu@master : -/Devops MasterKubernetesTasks /13_servi ces 
ervi ce . yml 
servi ce/my-service created 
ubuntu@master : -/Devops MasterKubernetesTasks /13_servi ces 
vi nginx_servi ce.yml 
kubectl apply -f nginx_s 
kubectl get svc 
NAME 
kubernetes 
my-servi ce 
TYPE 
Cl uster1P 
N0deport 
CLUSTER-IP 
10.96.0.1 
10 . 103.203.4 
EXTERNAL-IP 
<none> 
<none> 
PORT(S) 
443/TCP 
80 : 30007 [TCP 
AGE 
113m 
39s 
ubuntu@master:-/DevopsMasterKubernetesTasks/13_servi ces 

Machine generated alternative text:
Not secure 
server 
| 34.204.176.226:30007 
Imported From IE 
Imported 
Bookmarks bar 
DevApp 
Welcome to nginx! 
If you see this page, the nginx web server is successfully installed and 
working. Further configuration is required. 
For online documentation and support please refer to nginx.org. 
Commercial support is available at nginx.com. 
Thank you for using nginx. 

Machine generated alternative text:
Not secure 
Apps 
A 
server 
| 3.238.50.24:30007 
Imported From IE 
Imported 
Bookmarks bar 
DevApp 
Welcome to nginx! 
If you see this page, the nginx web server is successfully installed and 
working. Further configuration is required. 
For online documentation and support please refer to nginx.org. 
Commercial support is available at nginx.com. 
Thank you for using nginx. 

Task: 14:

TASK 14 : HOW DOES SELF HEALING WORK IN REPLICATION CONTROLLER

1 Get the list of rc

kubectl get rc

2 Get the list of services

kubectl get svc

3 Get the list of the pods running

kubectl get pods

4 Delete all pods

kubectl delete po --all

5 Get the list of the pods running

kubectl get pods

Machine generated alternative text:
ubuntu@master : -/Devops MasterKubernetesTasks /13_servi ces 
ubuntu@master : -/Devops MasterKubernetesTasks /13_servi ces 
NAME 
DESIRED 
5 
ngnnx 
CURRENT 
5 
READY 
5 
AGE 
26m 
ubuntu@master : -/Devops MasterKubernetesTasks /13_servi ces 
kubectl 
kubectl 
get 
get 
NAME 
TYPE 
kubernetes 
Cl uster1P 
N0deport 
my-servi ce 
NAME 
ngi nx-2kxvv 
nginx-fv259 
ngi nx-k89dk 
ngi nx-12cpp 
nginx-n47c5 
ubuntu@master . 
CLUSTER-IP 
10.96.0.1 
10 . 103.203.4 
EXTERNAL-IP 
<none> 
<none> 
PORT(S) 
443/TCP 
80 : 30007 [TCP 
ubuntu@master:-/DevopsMasterKubernetesTasks/13_servi ces kubectl get 
rc 
svc 
AGE 
117m 
4m55s 
pods 
READY 
1/1 
1/1 
1/1 
1/1 
1/1 
STATUS 
Running 
Running 
Running 
Running 
Running 
RESTARTS 
AGE 
21m 
27m 
27m 
21m 
27m 
• -/DevopsMasterKubernetesTasks/13_servi ces 

Machine generated alternative text:
ubuntu@master:-/DevopsMasterKubernetesTasks/13_servi ces kubectl 
NAME 
DESIRED 
5 
ngnnx 
CURRENT 
5 
READY 
5 
AGE 
26m 
ubuntu@master:-/DevopsMasterKubernetesTasks/13_servi ces kubectl 
get 
get 
NAME 
kubernetes 
my-servi ce 
TYPE 
Cl uster1P 
N0deport 
CLUSTER-IP 
10.96.0.1 
10 . 103.203.4 
EXTERNAL -IP 
<none> 
<none> 
PORT(S) 
443/TCP 
80 : 30007 [TCP 
ubuntu@master:-/DevopsMasterKubernetesTasks/13_servi ces kubectl 
get 
rc 
svc 
AGE 
117m 
4m55s 
pods 
NAME 
ngi nx-2kxvv 
nginx-fv259 
ngi nx-k89dk 
ngi nx-12cpp 
nginx-n47c5 
READY 
1/1 
1/1 
1/1 
1/1 
1/1 
STATUS 
Running 
Running 
Running 
Running 
Running 
RESTARTS 
AGE 
21m 
27m 
27m 
21m 
27m 
ubuntu@master:-/DevopsMasterKubernetesTasks/13_servi ces kubectl 
pod "nginx-2kxvv" deleted 
pod "nginx-fv259" del eted 
pod "nginx-k89dk" del eted 
pod "nginx-12cpp" deleted 
pod "nginx-n47c5" deleted 
ubuntu@master:-/DevopsMasterKubernetesTasks/13_servi ces kubectl 
delete po --all 
get pods 
NAME 
ngi nx-5qkmm 
ngi nx-dl 95t 
ngi nx-fxr54 
ngi nx-1 58th 
ngi nx-txbtq 
ubuntu@master . 
READY 
1/1 
1/1 
1/1 
1/1 
1/1 
STATUS 
Running 
Running 
Running 
Running 
Running 
RESTARTS 
AGE 
14 S 
13s 
14 S 
14 S 
14 S 
• -/DevopsMasterKubernetesTasks/13_servi ces 

Task 15:

TASK 15 : HOW DOES THE CLIENT PODS GET TO KNOW THE IP ADDRESS AND PORT OF

SERVICES(SERVICE DISCOVERY)

1 Get the list of rc

kubectl get rc

2 Get the list of services

kubectl get svc

3 Get the list of the pods running

kubectl get pods

4 View the environment variables in any one pod

kubectl exec <pod name> env

kubectl exec nginx-5qkmm env

Machine generated alternative text:
ubuntu@master:-/DevopsMasterKubernetesTasks/13_servi ces kubectl 
NAME 
DESIRED 
5 
ngnnx 
CURRENT 
5 
READY 
5 
AGE 
34m 
ubuntu@master:-/DevopsMasterKubernetesTasks/13_servi ces kubectl 
get 
get 
NAME 
kubernetes 
my-servi ce 
TYPE 
Cl uster1P 
N0deport 
CLUSTER-IP 
10.96.0.1 
10 . 103.203.4 
EXTERNAL -IP 
<none> 
<none> 
PORT(S) 
443/TCP 
80 : 30007 [TCP 
ubuntu@master:-/DevopsMasterKubernetesTasks/13_servi ces kubectl get 
rc 
svc 
AGE 
125m 
12m 
pods 
NAME 
ngi nx-5qkmm 
ngi nx-dl 95t 
ngi nx-fxr54 
ngi nx-1 58th 
ngi nx-txbtq 
READY 
1/1 
1/1 
1/1 
1/1 
1/1 
STATUS 
Running 
Running 
Running 
Running 
Running 
RESTARTS 
AGE 
6m56s 
6m55s 
6m56s 
6m56s 
6m56s 
ces kubectl exec nginx-5qkmm 
env 
kubectl exec [POD] [COMMAND] is DEPRECATED and will be removed in a future versi 
on. use kubectl exec [POD) [COMMAND] instead. 
PATH=/usr/1 ocal /sbi n : [us r/ 1 ocal /bi n : /usr/sbi n : [us r/bi n : /sbi n : /bi n 
HOSTNAME=ngi nx-5qkmm 
.103 . 203 . 4 
_PORT=tcp : //10 . 96.0.1:443 
KUBERNETES 
KUBERNETES_PORT_443_TCP_ADDR=10.96. O . 1 
: //10 .103 . 203 . 4 : 80 
MY_SERVICE_PORT_80_TCP_ADDR=10.103.203.4 
. 96 . O . 1 
: //10 .103 . 203.4 : 80 
_ : //10 . 96 . O . 1: 443 
KUBERNETES 
.19 . 3 
HOME=/root 
ubuntu@master:-/DevopsMasterKubernetesTasks/13_servi ces 