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Subject: Advanced Devops Lab (ADL)
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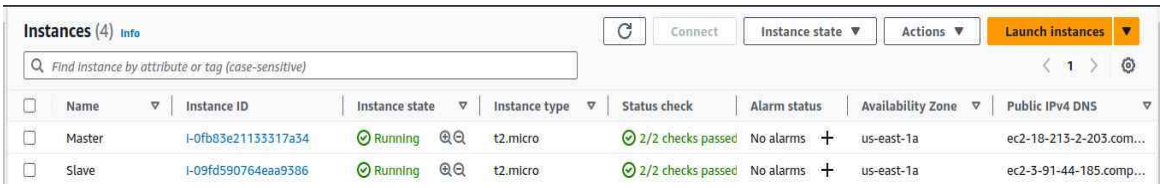
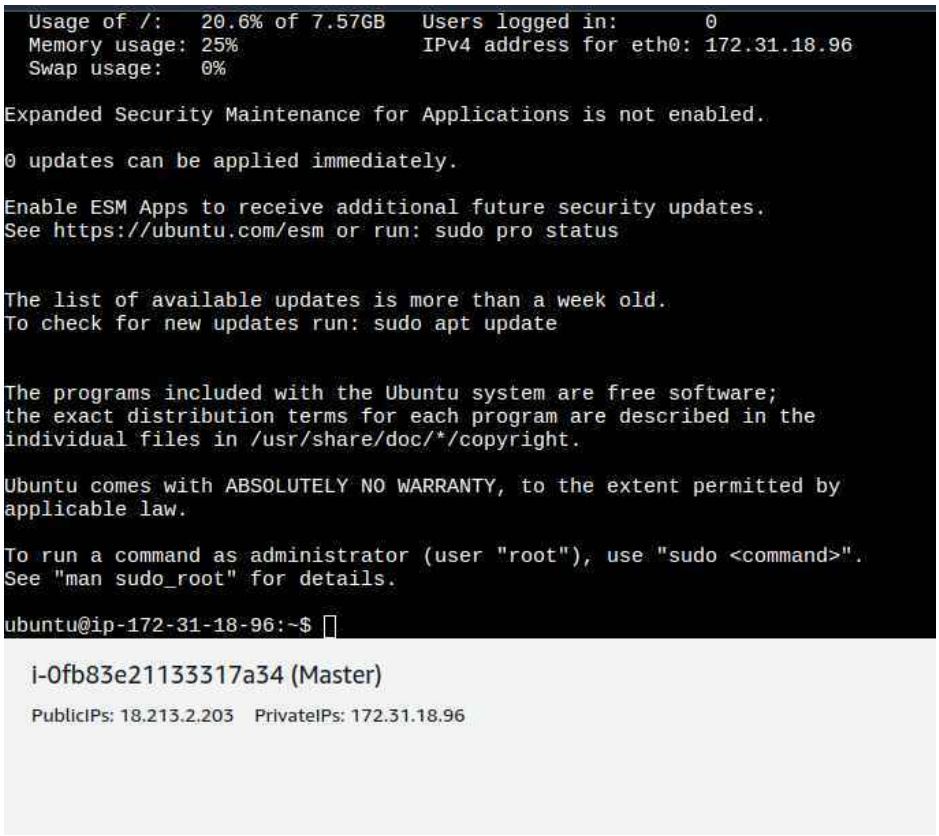
EXPERIMENT NO. 04

Aim: To install Kubectl and execute Kubectl commands to manage the Kubernetes cluster and deploy Your First Kubernetes Application.

Outputs:-





```
  Usage of /:   20.6% of 7.57GB   Users logged in:       0
  Memory usage: 23%               IPv4 address for eth0: 172.31.30.63
  Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


The list of available updates is more than a week old.
To check for new updates run: sudo apt update


The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-30-63:~$
```

i-09fd590764eaa9386 (Slave)

PublicIPs: 3.91.44.185 PrivateIPs: 172.31.30.63

```
ubuntu@ip-172-31-30-63:~$ sudo su
root@ip-172-31-30-63:/home/ubuntu# apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [109 kB]
Get:4 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]
```

```
root@ip-172-31-30-63:/home/ubuntu# apt-get install -y docker.io
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base pigz runc ubuntu-fan
Suggested packages:
  ifupdown aufs-tools cgroupfs-mount | cgroup-lite debootstrap docker-doc ri
The following NEW packages will be installed:
```

```
root@ip-172-31-18-96:/home/ubuntu# docker --version
Docker version 24.0.5, build 24.0.5-0ubuntu1~22.04.1
```

```
root@ip-172-31-18-96:/home/ubuntu# sudo systemctl enable docker
root@ip-172-31-18-96:/home/ubuntu# sudo systemctl start docker
root@ip-172-31-18-96:/home/ubuntu# sudo systemctl status docker
● docker.service - Docker Application Container Engine
     Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset: enabled)
     Active: active (running) since Fri 2023-10-13 09:03:18 UTC; 6min ago
TriggeredBy: ● docker.socket
       Docs: https://docs.docker.com
   Main PID: 2633 (dockerd)
      Tasks: 8
     Memory: 33.4M
        CPU: 305ms
     CGroup: /system.slice/docker.service
             └─2633 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

Oct 13 09:03:18 ip-172-31-18-96 systemd[1]: Starting Docker Application Container Engine..
Oct 13 09:03:18 ip-172-31-18-96 dockerd[2633]: time="2023-10-13T09:03:18.385031586Z" level
Oct 13 09:03:18 ip-172-31-18-96 dockerd[2633]: time="2023-10-13T09:03:18.386764695Z" level
Oct 13 09:03:18 ip-172-31-18-96 dockerd[2633]: time="2023-10-13T09:03:18.522620237Z" level
Oct 13 09:03:18 ip-172-31-18-96 dockerd[2633]: time="2023-10-13T09:03:18.831382238Z" level
Oct 13 09:03:18 ip-172-31-18-96 dockerd[2633]: time="2023-10-13T09:03:18.896882602Z" level
Oct 13 09:03:18 ip-172-31-18-96 dockerd[2633]: time="2023-10-13T09:03:18.897338266Z" level
Oct 13 09:03:18 ip-172-31-18-96 dockerd[2633]: time="2023-10-13T09:03:18.953706830Z" level
Oct 13 09:03:18 ip-172-31-18-96 systemd[1]: Started Docker Application Container Engine.
lines 1-21/21 (END)
```

```
root@ip-172-31-18-96:/home/ubuntu# apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu jammy-security InRelease
Reading package lists... Done
root@ip-172-31-18-96:/home/ubuntu# sudo apt-get install -y apt-transport-https ca-certificates curl
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
```

```
root@ip-172-31-18-96:/home/ubuntu# apt-mark hold kubelet kubeadm kubectl
kubelet set on hold.
kubeadm set on hold.
kubectl set on hold.
root@ip-172-31-18-96:/home/ubuntu# kubeadm version
kubeadm version: &version.Info{Major:"1", Minor:"28", GitVersion:"v1.28.2",
:34:32Z", GoVersion:"go1.20.8", Compiler:"gc", Platform:"linux/amd64"}
root@ip-172-31-18-96:/home/ubuntu#
```

```
root@ip-172-31-18-96:/home/ubuntu# sudo swapoff --a
root@ip-172-31-18-96:/home/ubuntu# kubeadm init --pod-network-cidr=10.244.0.0/16 --ignore-preflight-errors=all
[init] Using Kubernetes version: v1.28.2
[preflight] Running pre-flight checks
        [WARNING NumCPU]: the number of available CPUs 1 is less than the required 2
        [WARNING Mem]: the system RAM (965 MB) is less than the minimum 1700 MB
[preflight] Pulling images required for setting up a Kubernetes cluster
[preflight] This might take a minute or two, depending on the speed of your internet connection
[preflight] You can also perform this action in beforehand using 'kubeadm config images pull'
W1013 09:24:39.104055    9523 checks.go:835] detected that the sandbox image "registry.k8s.io/pause:3.8" of the c
```

```
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 172.31.18.96:6443 --token iwuxci.4bq4oa6th8aso7b4 \
        --discovery-token-ca-cert-hash sha256:fea4f1e4a738b82bb7067cd7e6617962d459a3e66836cd041303344276dbecdd
root@ip-172-31-18-96:/home/ubuntu#
```

Conclusion: Thus, we have successfully installed Kubectl and execute Kubectl commands to manage the Kubernetes cluster and deployed our First Kubernetes Application.