Experiment -3.1

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Subject Name: Docker and Kubernetes
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1. Aim/Overview of the practical:

Installing Kubernetes as a Single Node.

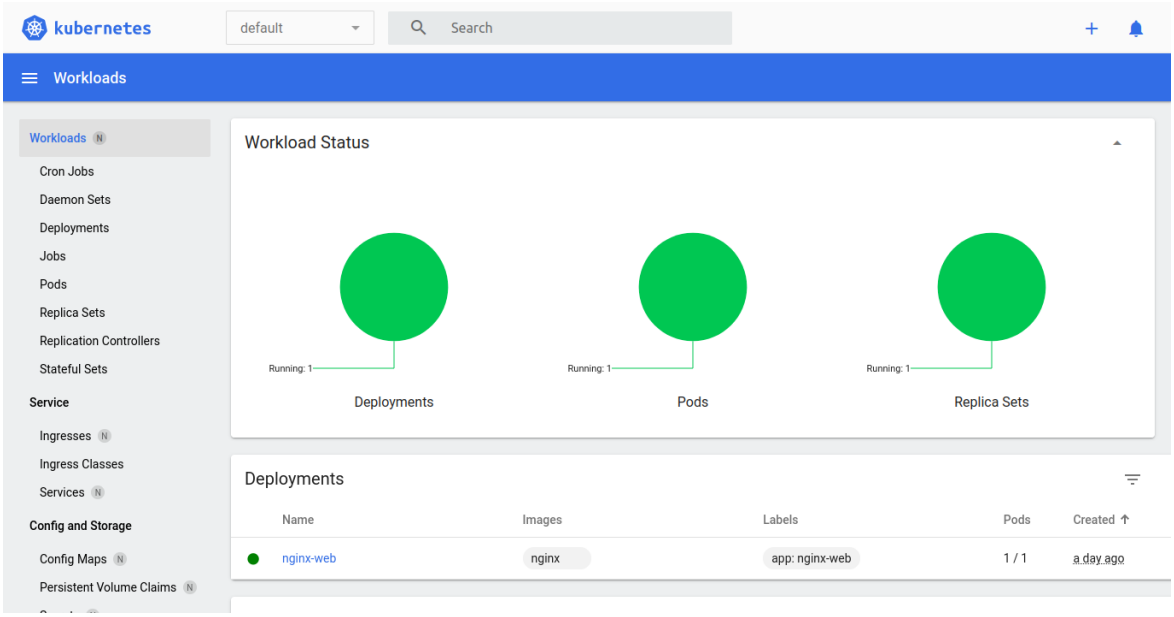
2. Apparatus: PC, Docker Engine, Kubernetes, Minikube, Ubuntu Linux

3. Steps for experiment/practical:

- To install the latest minikube stable release on x86-64 Linux using binary download:
    1. curl -LO https://storage.googleapis.com/minikube/releases/latest/minikube-linux-amd64
    2. sudo install minikube-linux-amd64 /usr/local/bin/minikube && rm minikube-linux-amd64
- From a terminal with administrator access (but not logged in as root), run:
    1. minikube start
- minikube can download the appropriate version of kubectl and you should be able to use it like this:
    1. minikube kubectl -- get po -A
- Initially, some services such as the storage-provisioner, may not yet be in a Running state. This is a normal condition during cluster bring-up, and will resolve itself momentarily. For additional insight into your cluster state, minikube bundles the Kubernetes Dashboard, allowing you to get easily acclimated to your new environment:
    1. minikube dashboard
- Create a sample deployment and expose it on port 8080:
    1. kubectl create deployment hello-minikube --image=kicbase/echo-server:1.0
    2. kubectl expose deployment hello-minikube --type=NodePort --port=8080

- The easiest way to access this service is to let minikube launch a web browser for you:
    1. minikube service hello-minikube

- minikube kubectl -- port-forward service/hello-minikube 7080:8080



- Management of clusters and pods

```
chayan@chayan-virtual-machine:~$ minikube stop
✋  Stopping node "minikube"  ...
🛑  Powering off "minikube" via SSH ...
🛑  1 node stopped.
chayan@chayan-virtual-machine:~$ minikube start
😄  minikube v1.34.0 on Ubuntu 22.04
✨  Using the docker driver based on existing profile
👍  Starting "minikube" primary control-plane node in "minikube" cluster
🚜  Pulling base image v0.0.45 ...
🔄  Restarting existing docker container for "minikube" ...
🐳  Preparing Kubernetes v1.31.0 on Docker 27.2.0 ...
🔎  Verifying Kubernetes components...
    ▪ Using image registry.k8s.io/ingress-nginx/controller:v1.11.2
    ▪ Using image registry.k8s.io/ingress-nginx/kube-webhook-certgen:v1.4.3
    ▪ Using image registry.k8s.io/ingress-nginx/kube-webhook-certgen:v1.4.3
    ▪ Using image docker.io/kubernetesui/metrics-scraper:v1.0.8
    ▪ Using image docker.io/kubernetesui/dashboard:v2.7.0
    ▪ Using image gcr.io/k8s-minikube/storage-provisioner:v5
🔎  Verifying ingress addon...
💡  Some dashboard features require the metrics-server addon. To enable all features please run:

        minikube addons enable metrics-server

🌟  Enabled addons: storage-provisioner, dashboard, ingress, default-storageclass
🏄  Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
chayan@chayan-virtual-machine:~$ minikube delete
```

Learning outcomes (What I have learnt):

1. I have learnt the concept of containerization and virtualization.

2. I have learnt about orchestration and orchestration tools.

3. I have learnt about Kubernetes and its architecture.

4. I have learnt the purpose of using microservice architecture over monolithic.

Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			