Cloud Computing
Assignment 2b

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Deliverables

Screenshot 1a - Minikube running successfully

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % minikube start
😄   minikube v1.29.0 on Darwin 12.3.1 (arm64)
✨   Using the docker driver based on existing profile
🏃   Starting control plane node minikube in cluster minikube
👍   Pulling base image ...
🔄   Restarting existing docker container for "minikube" ...
🖼   Preparing Kubernetes v1.26.1 on Docker 20.10.23 ...
🔗   Configuring bridge CNI (Container Networking Interface) ...
🔎   Verifying Kubernetes components...
    ▪ Using image gcr.io/k8s-minikube/storage-provisioner:v5
🌟   Enabled addons: default-storageclass, storage-provisioner
🎉   Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
```

Screenshot 2a - get nodes, pod and services command.

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl get nodes
NAME       STATUS   ROLES    AGE    VERSION
minikube   Ready    <none>   45h    v1.26.1
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl get pod
No resources found in default namespace.
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl get services
NAME         TYPE        CLUSTER-IP    EXTERNAL-IP   PORT(S)    AGE
kubernetes   ClusterIP   10.96.0.1     <none>        443/TCP    45h
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 2b- Deployment created.

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl create deployment pes1ug20cs484 --image=nginx
deployment.apps/pes1ug20cs484 created
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 2c- get deployment and pod command .

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl get deployment
NAME            READY   UP-TO-DATE   AVAILABLE   AGE
pes1ug20cs484   1/1     1            1           18s
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl get pod
NAME                             READY   STATUS    RESTARTS   AGE
pes1ug20cs484-6f7c876b58-dzqlx   1/1     Running   0          23s
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 2d- editing '-image:nginx.'

```
    spec:
      containers:
      - image: nginx:1.16
        imagePullPolicy: Always
        name: nginx
        resources: {}
```

Screenshot 2e- showing edited deployment.

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl edit deployment pes1ug20cs484
deployment.apps/pes1ug20cs484 edited
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 2f- deployment is rolled back.

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl rollout undo deployment/pes1ug20cs484
deployment.apps/pes1ug20cs484 rolled back
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 2g- showing original nginx image.

```
  Containers:
   nginx:
    Image:        nginx
    Port:         <none>
```

Screenshot 3a - Kubectl logs displayed.

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl get pod
NAME                              READY   STATUS    RESTARTS   AGE
pes1ug20cs484-6f7c876b58-dzqlx    1/1     Running   0          16m
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl logs pes1ug20cs484-6f7c876b58-dzqlx
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2023/02/23 06:33:23 [notice] 1#1: using the "epoll" event method
2023/02/23 06:33:23 [notice] 1#1: nginx/1.23.3
2023/02/23 06:33:23 [notice] 1#1: built by gcc 10.2.1 20210110 (Debian 10.2.1-6)
2023/02/23 06:33:23 [notice] 1#1: OS: Linux 5.15.49-linuxkit
2023/02/23 06:33:23 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2023/02/23 06:33:23 [notice] 1#1: start worker processes
2023/02/23 06:33:23 [notice] 1#1: start worker process 29
2023/02/23 06:33:23 [notice] 1#1: start worker process 30
2023/02/23 06:33:23 [notice] 1#1: start worker process 31
2023/02/23 06:33:23 [notice] 1#1: start worker process 32
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 3b- Kubectl 'describe pod ' command.

```
                          node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type    Reason     Age   From                Message
  ----    ------     ----  ----                -------
  Normal  Scheduled  17m   default-scheduler   Successfully assigned default/pes1ug20cs484-6f7c876b58-dzqlx to minikube
  Normal  Pulling    17m   kubelet             Pulling image "nginx"
  Normal  Pulled     17m   kubelet             Successfully pulled image "nginx" in 10.412306588s (10.412375088s including waiting)
  Normal  Created    17m   kubelet             Created container nginx
  Normal  Started    17m   kubelet             Started container nginx
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 3c - Create mongo deployment.

```
vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl get pod
NAME                                READY   STATUS    RESTARTS   AGE
pes1ug20cs484-6f7c876b58-dzqlx      1/1     Running   0          34m
pes1ug20cs484-mongo-58f896c95f-8487m 1/1    Running   0          2m1s
vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl exec -it pes1ug20cs484-mongo-58f896c95f-8487m -- bin/bash
[root@pes1ug20cs484-mongo-58f896c95f-8487m:/# ls
bin  boot  data  dev  docker-entrypoint-initdb.d  etc  home  js-yaml.js  lib  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var
[root@pes1ug20cs484-mongo-58f896c95f-8487m:/# exit
exit
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 3d - Delete both requirements.

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl delete deployment pes1ug20cs484
deployment.apps "pes1ug20cs484" deleted
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl delete deployment pes1ug20cs484-mongo
deployment.apps "pes1ug20cs484-mongo" deleted
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 4a - Kubectl apply command on yaml file.

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl apply -f nginx-deployment.yaml
deployment.apps/nginx-deployment-pes1ug20cs484 created
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 4b- Kubectl get on yaml file

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl get deployment nginx-deployment-pes1ug20cs484 -o yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  annotations:
    deployment.kubernetes.io/revision: "1"
    kubectl.kubernetes.io/last-applied-configuration: |
      {"apiVersion":"apps/v1","kind":"Deployment","metadata":{"annotations":{},"labels":{"app":"nginx"
te":{"metadata":{"labels":{"app":"nginx"}},"spec":{"containers":[{"image":"nginx:1.22","name":"nginx",
  creationTimestamp: "2023-02-23T07:12:44Z"
  generation: 2
  labels:
    app: nginx
  name: nginx-deployment-pes1ug20cs484
  namespace: default
  resourceVersion: "8272"
  uid: 8decda45-1ca2-40e6-af41-6576395a6c81
spec:
  progressDeadlineSeconds: 600
  replicas: 3
  revisionHistoryLimit: 10
  selector:
    matchLabels:
      app: nginx
  strategy:
    rollingUpdate:
      maxSurge: 25%
      maxUnavailable: 25%
    type: RollingUpdate
  template:
    metadata:
      creationTimestamp: null
      labels:
        app: nginx
    spec:
      containers:
      - image: nginx:1.22
        imagePullPolicy: IfNotPresent
        name: nginx
        ports:
        - containerPort: 80
          protocol: TCP
        resources: {}
        terminationMessagePath: /dev/termination-log
        terminationMessagePolicy: File
      dnsPolicy: ClusterFirst
      restartPolicy: Always
      schedulerName: default-scheduler
      securityContext: {}
      terminationGracePeriodSeconds: 30
status:
  availableReplicas: 3
  conditions:
  - lastTransitionTime: "2023-02-23T07:12:44Z"
    lastUpdateTime: "2023-02-23T07:14:52Z"
    message: ReplicaSet "nginx-deployment-pes1ug20cs484-8cf4bf97" has successfully
      progressed.
    reason: NewReplicaSetAvailable
    status: "True"
    type: Progressing
  - lastTransitionTime: "2023-02-23T07:16:11Z"
    lastUpdateTime: "2023-02-23T07:16:11Z"
    message: Deployment has minimum availability.
    reason: MinimumReplicasAvailable
    status: "True"
    type: Available
  observedGeneration: 2
  readyReplicas: 3
  replicas: 3
  updatedReplicas: 3
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 5a - Deleted pod

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl get pod
NAME                                        READY   STATUS    RESTARTS   AGE
nginx-deployment-pes1ug20cs484-8cf4bf97-2vffr   1/1   Running   0        3m24s
nginx-deployment-pes1ug20cs484-8cf4bf97-5cjw5   1/1   Running   0        6m48s
nginx-deployment-pes1ug20cs484-8cf4bf97-prz68   1/1   Running   0        9s
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl delete pod nginx-deployment-pes1ug20cs484-8cf4bf97-prz68
pod "nginx-deployment-pes1ug20cs484-8cf4bf97-prz68" deleted
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl get pod
NAME                                        READY   STATUS    RESTARTS   AGE
nginx-deployment-pes1ug20cs484-8cf4bf97-2vffr   1/1   Running   0        4m6s
nginx-deployment-pes1ug20cs484-8cf4bf97-5cjw5   1/1   Running   0        7m30s
nginx-deployment-pes1ug20cs484-8cf4bf97-f4rc5   1/1   Running   0        4s
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 6a- Kubectl apply and get command.

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl apply -f nginx-service.yaml
service/nginx-service-pes1ug20cs484 created
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl get service
NAME                          TYPE        CLUSTER-IP     EXTERNAL-IP   PORT(S)    AGE
kubernetes                    ClusterIP   10.96.0.1      <none>        443/TCP    46h
nginx-service-pes1ug20cs484   ClusterIP   10.96.34.115   <none>        8080/TCP   6s
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 6b-kubectl get pod -o wide command

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl get pod -o wide
NAME                                        READY  STATUS   RESTARTS  AGE    IP            NODE      NOMINATED NODE  READINESS GATES
nginx-deployment-pes1ug20cs484-8cf4bf97-2vffr  1/1   Running  0        6m18s  10.244.0.46   minikube  <none>          <none>
nginx-deployment-pes1ug20cs484-8cf4bf97-5cjw5  1/1   Running  0        9m42s  10.244.0.44   minikube  <none>          <none>
nginx-deployment-pes1ug20cs484-8cf4bf97-f4rc5  1/1   Running  0        2m16s  10.244.0.48   minikube  <none>          <none>
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 7a -Kubectl port-forward command

```
vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl port-forward service/nginx-service-pes1ug20cs484 8080:8080

Forwarding from 127.0.0.1:8080 -> 80
Forwarding from [::1]:8080 -> 80
```

Screenshot 7b- Display welcome to nginx on web page

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.

Screenshot 8a - Delete nginx deployments

```
vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl delete deployment nginx-deployment-pes1ug20cs484
deployment.apps "nginx-deployment-pes1ug20cs484" deleted
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl delete service nginx-service-pes1ug20cs484
service "nginx-service-pes1ug20cs484" deleted
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 8b - stop minikube

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % minikube stop
✋   Stopping node "minikube"  ...
🛑   Powering off "minikube" via SSH ...
🛑   1 node stopped.
vanshikagoel@Vanshikas-MacBook-Air ~ %
```
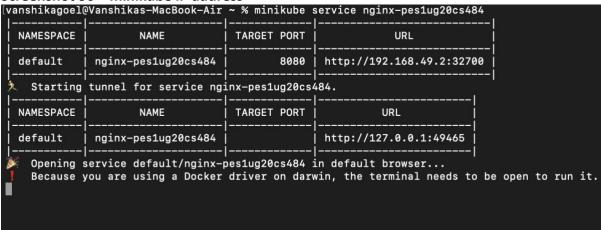
Screenshot 9a- the command which exposes specifies the type of service (NodePort)

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl create deployment nginx-pes1ug20cs484 --image=nginx
deployment.apps/nginx-pes1ug20cs484 created
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl expose deployment nginx-pes1ug20cs484 --type=NodePort --port=8080 --target-port=80
service/nginx-pes1ug20cs484 exposed
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 9b - kubectl get service command which displays the node port

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % kubectl get service
NAME                 TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)          AGE
kubernetes           ClusterIP   10.96.0.1       <none>        443/TCP          2d9h
nginx-pes1ug20cs484  NodePort    10.110.171.7    <none>        8080:32700/TCP   48s
vanshikagoel@Vanshikas-MacBook-Air ~ %
```

Screenshot 9c - minikube IP address

```
[vanshikagoel@Vanshikas-MacBook-Air ~ % minikube service nginx-pes1ug20cs484
|-----------|---------------------|-------------|---------------------------|
| NAMESPACE |        NAME         | TARGET PORT |            URL            |
|-----------|---------------------|-------------|---------------------------|
| default   | nginx-pes1ug20cs484 |        8080 | http://192.168.49.2:32700 |
|-----------|---------------------|-------------|---------------------------|
🏃   Starting tunnel for service nginx-pes1ug20cs484.
|-----------|---------------------|-------------|------------------------|
| NAMESPACE |        NAME         | TARGET PORT |          URL           |
|-----------|---------------------|-------------|------------------------|
| default   | nginx-pes1ug20cs484 |             | http://127.0.0.1:49465 |
|-----------|---------------------|-------------|------------------------|
🎉   Opening service default/nginx-pes1ug20cs484 in default browser...
❗   Because you are using a Docker driver on darwin, the terminal needs to be open to run it.
```

Screenshot 9d - the webpage with the IP Address visible.