TASK 5: Build a Kubernetes Cluster Locally with Minikube

- **Objective:** Deploy and manage apps in Kubernetes.

- **Tools:** Minikube, kubectl, Docker

- **Deliverables:** YAML files, screenshots of pods/services

- **Hints:**
    a. Install Minikube & start the cluster.
    b. Create deployment.yaml for an app.
    c. Expose app using service.yaml.
    d. Use kubectl get pods to verify.
    e. Scale deployments using kubectl scale.
    f. Use kubectl describe for logs.

Screenshots:

Drive URL :
https://docs.google.com/document/d/1qevbkqjBtxQIDuLdaccK9UdANYX7vLLXZ3CtQTrXEPk/edit?usp=sharing

Top window terminal:

```
Jawahar@Jawahar:~$ docker --version
Docker version 27.5.1, build 27.5.1-0ubuntu3~24.04.2
Jawahar@Jawahar:~$ minikube version
minikube version: v1.36.0
commit: f8f52f5de11fc6ad8244afac475e1d0f96841df1-dirty
Jawahar@Jawahar:~$ kubectl version --client
Client Version: v1.33.3
Kustomize Version: v5.6.0
Jawahar@Jawahar:~$
```

Bottom window terminal:

```
minikube version: v1.36.0
commit: f8f52f5de11fc6ad8244afac475e1d0f96841df1-dirty
Jawahar@Jawahar:~$ kubectl version --client
Client Version: v1.33.3
Kustomize Version: v5.6.0
Jawahar@Jawahar:~$ minikube status
minikube
type: Control Plane
host: Stopped
kubelet: Stopped
apiserver: Stopped
kubeconfig: Stopped

Jawahar@Jawahar:~$ minikube start --driver=docker
    minikube v1.36.0 on Ubuntu 24.04 (vbox/amd64)
    Using the docker driver based on existing profile
    Starting "minikube" primary control-plane node in "minikube" cluster
    Pulling base image v0.0.47 ...
    Restarting existing docker container for "minikube" ...
    Preparing Kubernetes v1.33.1 on Docker 28.1.1 ...
    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
Jawahar@Jawahar:~$ minikube status
minikube
type: Control Plane
host: Running
kubelet: Running
apiserver: Running
kubeconfig: Configured

Jawahar@Jawahar:~$
```

Bottom window - deployment.yaml:

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
spec:
  replicas: 2
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:stable
        ports:
        - containerPort: 80
```

Top window - deployment.yaml:

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
spec:
  replicas: 2
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
        - name: nginx
          image: nginx:stable
          ports:
            - containerPort: 80
```

Top window - Terminal:

```
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl apply -f deployment.yaml
error: no objects passed to apply
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl apply -f deployment.yaml
error: no objects passed to apply
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl apply -f deployment.yaml
deployment.apps/nginx-deployment created
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl get deployments
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
nginx-deployment    0/2     2            0           10s
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl get pods -o wide
NAME                                    READY   STATUS             RESTARTS   AGE     I
P        NODE      NOMINATED NODE   READINESS GATES
nginx-deployment-5654587fb9-2r56p       0/1     ContainerCreating   0          16s     <
none>    minikube  <none>           <none>
nginx-deployment-5654587fb9-hdvw4       0/1     ContainerCreating   0          16s     <
none>    minikube  <none>           <none>
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$
```

Bottom window - service.yaml:

```yaml
apiVersion: v1
kind: Service
metadata:
  name: nginx-service
spec:
  type: NodePort
  selector:
    app: nginx
  ports:
    - port: 80
      targetPort: 80
      nodePort: 30007
```

Bottom window - Terminal:

```
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl apply -f deployment.yaml
error: no objects passed to apply
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl apply -f deployment.yaml
error: no objects passed to apply
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl apply -f deployment.yaml
deployment.apps/nginx-deployment created
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl get deployments
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
nginx-deployment    0/2     2            0           10s
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl get pods -o wide
NAME                                    READY   STATUS             RESTARTS   AGE    IP       N
ODE      NOMINATED NODE   READINESS GATES
nginx-deployment-5654587fb9-2r56p       0/1     ContainerCreating   0          16s    <none>   m
inikube  <none>           <none>
nginx-deployment-5654587fb9-hdvw4       0/1     ContainerCreating   0          16s    <none>   m
inikube  <none>           <none>
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$
```

Screenshot 1 (top):

File Edit Selection View Go Run ··· Jawahar [SSH: 192.168.1.3]

EXPLORER

JAWAHAR [SSH: 192.168.1.3]
- .cache
- .dotnet
- .gnupg
- .kube
- .local
- .minikube
- .ssh
- .terraform.d
- .vscode-server
- aws
- Elevate-Labs-Projects
- Elevate-Labs-Projects-Task05
  - ! deployment.yaml
  - ! service.yaml
- kubernetes
- snap
- Terraform-Task-02
- .bash_history
- .bash_logout
- .bashrc
- .gitconfig
- .lesshst
- .profile

OUTLINE
TIMELINE

deployment.yaml   ! service.yaml ×

Elevate-Labs-Projects-Task05 > ! service.yaml

```
1  apiVersion: v1
2  kind: Service
3  metadata:
4    name: nginx-service
5  spec:
6    type: NodePort
7    selector:
8      app: nginx
9    ports:
10   - port: 80
11     targetPort: 80
12     nodePort: 30007
13
```

PROBLEMS OUTPUT TERMINAL ···

Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ minikube service nginx-service --url
http://192.168.49.2:30007
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$

Ln 13, Col 1   Spaces: 2   UTF-8   LF   YAML
SSH: 192.168.1.3   04:25:55 PM 12-08-2025

Screenshot 2 (bottom):

File Edit Selection View Go Run ··· Jawahar [SSH: 192.168.1.3]

EXPLORER

JAWAHAR [SSH: 192.168.1.3]
- .cache
- .dotnet
- .gnupg
- .kube
- .local
- .minikube
- .ssh
- .terraform.d
- .vscode-server
- aws
- Elevate-Labs-Projects
- Elevate-Labs-Projects-Task05
  - ! deployment.yaml
  - ! service.yaml
- kubernetes
- snap
- Terraform-Task-02
- .bash_history
- .bash_logout
- .bashrc
- .gitconfig
- .lesshst
- .profile

OUTLINE
TIMELINE

deployment.yaml   ! service.yaml ×

Elevate-Labs-Projects-Task05 > ! service.yaml

```
1  apiVersion: v1
2  kind: Service
3  metadata:
4    name: nginx-service
5  spec:
6    type: NodePort
7    selector:
8      app: nginx
9    ports:
10   - port: 80
11     targetPort: 80
12     nodePort: 30007
13
```

PROBLEMS OUTPUT TERMINAL ···

Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ minikube service nginx-service --url
http://192.168.49.2:30007
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ curl http://192.168.49.2:30007
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
html { color-scheme: light dark; }
body { width: 35em; margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif; }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
nginx.org.
Commercial support is available at
nginx.com.</p>

<p>Thank you for using nginx.</p>
</body>
</html>
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$

Ln 13, Col 1   Spaces: 2   UTF-8   LF   YAML
SSH: 192.168.1.3   04:27:58 PM 12-08-2025

service.yaml

```yaml
apiVersion: v1
kind: Service
metadata:
  name: nginx-service
spec:
  type: NodePort
  selector:
    app: nginx
  ports:
    - port: 80
      targetPort: 80
      nodePort: 30007
```

Terminal (Screenshot 1):

```
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl get pods -o wide
NAME                                  READY   STATUS             RESTARTS   AGE     IP           NODE
                        NOMINATED NODE   READINESS GATES
nginx-deployment-5654587fb9-2r56p     1/1     Running            0          5m44s   10.244.0.7   minik
ube   <none>           <none>
nginx-deployment-5654587fb9-hdvw4     1/1     Running            0          5m44s   10.244.0.6   minik
ube   <none>           <none>
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl scale deployment nginx-deployment -
-replicas=4
deployment.apps/nginx-deployment scaled
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl get pods
NAME                                  READY   STATUS             RESTARTS   AGE
nginx-deployment-5654587fb9-2r56p     1/1     Running            0          6m47s
nginx-deployment-5654587fb9-b796f     0/1     ContainerCreating  0          6s
nginx-deployment-5654587fb9-hdvw4     1/1     Running            0          6m47s
nginx-deployment-5654587fb9-w9px4     0/1     ContainerCreating  0          6s
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl get pods
NAME                                  READY   STATUS             RESTARTS   AGE
nginx-deployment-5654587fb9-2r56p     1/1     Running            0          7m56s
nginx-deployment-5654587fb9-b796f     1/1     Running            0          75s
nginx-deployment-5654587fb9-hdvw4     1/1     Running            0          7m56s
nginx-deployment-5654587fb9-w9px4     1/1     Running            0          75s
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$
```

---

service.yaml

```yaml
apiVersion: v1
kind: Service
metadata:
  name: nginx-service
spec:
  type: NodePort
  selector:
    app: nginx
  ports:
    - port: 80
      targetPort: 80
      nodePort: 30007
```

Terminal (Screenshot 2):

```
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl describe pod nginx-deployment-56545
87fb9-2r56p
Name:             nginx-deployment-5654587fb9-2r56p
Namespace:        default
Priority:         0
Service Account:  default
Node:             minikube/192.168.49.2
Start Time:       Tue, 12 Aug 2025 10:53:58 +0000
Labels:           app=nginx
                  pod-template-hash=5654587fb9
Annotations:      <none>
Status:           Running
IP:               10.244.0.7
IPs:
  IP:             10.244.0.7
Controlled By:    ReplicaSet/nginx-deployment-5654587fb9
Containers:
  nginx:
    Container ID:   docker://e93dd9bae7f150ffc6f85bbcb04698d9b59f662075c42bafacda3b32d498c3
15
    Image:          nginx:stable
    Image ID:       docker-pullable://nginx@sha256:7935b9ee80fe4076ce8ca637fe7bb0c7a1268e2b
d854032a0563ecc96bfa6747
    Port:           80/TCP
    Host Port:      0/TCP
    State:          Running
      Started:      Tue, 12 Aug 2025 10:55:34 +0000
    Ready:          True
    Restart Count:  0
    Environment:    <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-zw849 (ro)
Conditions:
```

Top window — VS Code editor (service.yaml):

```yaml
apiVersion: v1
kind: Service
metadata:
  name: nginx-service
spec:
  type: NodePort
  selector:
    app: nginx
  ports:
    - port: 80
      targetPort: 80
      nodePort: 30007
```

Top window — TERMINAL:

```
Type       Reason      Age     From                Message
----       ------      ----    ----                -------
Normal     Scheduled   8m42s   default-scheduler   Successfully assigned default/nginx-deployme
nt-5654587fb9-2r56p to minikube
Normal     Pulling     8m38s   kubelet             Pulling image "nginx:stable"
Normal     Pulled      7m8s    kubelet             Successfully pulled image "nginx:stable" in
4.192s (1m30.138s including waiting). Image size: 192474705 bytes.
Normal     Created     7m7s    kubelet             Created container: nginx
Normal     Started     7m6s    kubelet             Started container nginx
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl logs nginx-deployment-5654587fb9-2r
56p
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configur
ation
/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.co
nf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.
conf
/docker-entrypoint.sh: Sourcing /docker-entrypoint.d/15-local-resolvers.envsh
/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
2025/08/12 10:55:36 [notice] 1#1: using the "epoll" event method
2025/08/12 10:55:36 [notice] 1#1: nginx/1.28.0
2025/08/12 10:55:36 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2025/08/12 10:55:36 [notice] 1#1: OS: Linux 6.8.0-64-generic
2025/08/12 10:55:36 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2025/08/12 10:55:36 [notice] 1#1: start worker processes
2025/08/12 10:55:36 [notice] 1#1: start worker process 29
2025/08/12 10:55:36 [notice] 1#1: start worker process 30
10.244.0.1 - - [12/Aug/2025:10:56:31 +0000] "GET / HTTP/1.1" 200 615 "-" "curl/8.5.0" "-"
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$
```

Bottom window — TERMINAL:

```
2025/08/12 10:55:36 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2025/08/12 10:55:36 [notice] 1#1: OS: Linux 6.8.0-64-generic
2025/08/12 10:55:36 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2025/08/12 10:55:36 [notice] 1#1: start worker processes
2025/08/12 10:55:36 [notice] 1#1: start worker process 29
2025/08/12 10:55:36 [notice] 1#1: start worker process 30
10.244.0.1 - - [12/Aug/2025:10:56:31 +0000] "GET / HTTP/1.1" 200 615 "-" "curl/8.5.0" "-"
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl delete -f service.yaml
service "nginx-service" deleted
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl delete -f deployment.yaml
deployment.apps "nginx-deployment" deleted
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ minikube stop
✋  Stopping node "minikube"  ...
🔴  Powering off "minikube" via SSH ...
🛑  1 node stopped.
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ minikube delete
🔥  Deleting "minikube" in docker ...
🔥  Deleting container "minikube" ...
🔥  Removing /home/Jawahar/.minikube/machines/minikube ...
💀  Removed all traces of the "minikube" cluster.
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$ kubectl get pods
E0812 11:04:50.506456   12064 memcache.go:265] "Unhandled Error" err="couldn't get current
server API group list: invalid character '<' looking for beginning of value"
E0812 11:04:50.690445   12064 memcache.go:265] "Unhandled Error" err="couldn't get current
server API group list: invalid character '<' looking for beginning of value"
E0812 11:04:50.988749   12064 memcache.go:265] "Unhandled Error" err="couldn't get current
server API group list: invalid character '<' looking for beginning of value"
E0812 11:04:51.245336   12064 memcache.go:265] "Unhandled Error" err="couldn't get current
server API group list: invalid character '<' looking for beginning of value"
E0812 11:04:51.757760   12064 memcache.go:265] "Unhandled Error" err="couldn't get current
server API group list: invalid character '<' looking for beginning of value"
error: invalid character '<' looking for beginning of value
Jawahar@Jawahar:~/Elevate-Labs-Projects-Task05$
```