Q. Deploy a Multi-Tier Web Application to Kubernetes


```
deployment.apps/nginx created
master@master-vm:~/Desktop/multi-tier-application/nginx$ kubectl apply -f nginx-service.yaml
service/nginx-service created
master@master-vm:~/Desktop/multi-tier-application/nginx$ kubectl get all -o wide
NAME                                    READY   STATUS             RESTARTS   AGE   IP                NODE         NOMINATED NODE   READIN
ESS GATES
pod/flask-app-6f9964f859-bjfkd          1/1     Running            0          87s   192.168.114.101   worker2-vm   <none>           <none>
pod/flask-app-6f9964f859-djcv6          1/1     Running            0          87s   192.168.94.242    worker1-vm   <none>           <none>
pod/flask-app-6f9964f859-q8dsz          1/1     Running            0          87s   192.168.114.100   worker2-vm   <none>           <none>
pod/flask-app-6f9964f859-qh6ch          1/1     Running            0          87s   192.168.94.241    worker1-vm   <none>           <none>
pod/mysql-66d468f74c-9h8lm              0/1     ContainerCreating  0          63s   <none>            worker2-vm   <none>           <none>
pod/nginx-78b5b78b99-j9t9r              0/1     ContainerCreating  0          17s   <none>            worker2-vm   <none>           <none>

NAME                    TYPE       CLUSTER-IP       EXTERNAL-IP   PORT(S)       AGE   SELECTOR
service/flask-service   ClusterIP  10.111.249.32    <none>        5000/TCP      78s   app=flask
service/kubernetes      ClusterIP  10.96.0.1        <none>        443/TCP       19d   <none>
service/mysql           ClusterIP  10.100.136.170   <none>        3306/TCP      63s   app=mysql
service/nginx-service   NodePort   10.108.127.46    <none>        80:30007/TCP  10s   app=nginx

NAME                        READY   UP-TO-DATE   AVAILABLE   AGE   CONTAINERS   IMAGES                      SELECTOR
deployment.apps/flask-app   4/4     4            4           87s   flask        barathkumar29/flasks        app=flask
deployment.apps/mysql       0/1     1            0           63s   mysql        mysql:5.7                   app=mysql
deployment.apps/nginx       0/1     1            0           17s   nginx        nginx                       app=nginx

NAME                                            DESIRED   CURRENT   READY   AGE   CONTAINERS   IMAGES                      SELECTOR
replicaset.apps/flask-app-6f9964f859            4         4         4       87s   flask        barathkumar29/flasks        app=flask,pod-template-
hash=6f9964f859
replicaset.apps/mysql-66d468f74c                1         1         0       63s   mysql        mysql:5.7                   app=mysql,pod-template-
hash=66d468f74c
replicaset.apps/nginx-78b5b78b99                1         1         0       17s   nginx        nginx                       app=nginx,pod-template-
hash=78b5b78b99

NAME                                                   REFERENCE              TARGETS   MINPODS   MAXPODS   REPLICAS   AGE
horizontalpodautoscaler.autoscaling/flask-app          Deployment/flask-app   3%/50%    3         10        4          4d5h
master@master-vm:~/Desktop/multi-tier-application/nginx$
```



```
master@master-vm:~/Desktop/multi-tier-application/nginx$ kubectl get nodes
NAME         STATUS   ROLES           AGE   VERSION
master-vm    Ready    control-plane   19d   v1.28.15
worker1-vm   Ready    <none>          19d   v1.28.15
worker2-vm   Ready    <none>          19d   v1.28.15
master@master-vm:~/Desktop/multi-tier-application/nginx$ kubectl get nodes -o wide
NAME         STATUS   ROLES           AGE   VERSION    INTERNAL-IP       EXTERNAL-IP   OS-IMAGE           KERNEL-VERSION       CON
TAINER-RUNTIME
master-vm    Ready    control-plane   19d   v1.28.15   192.168.147.128   <none>        Ubuntu 20.04.6 LTS 5.15.0-134-generic   con
tainerd://1.7.24
worker1-vm   Ready    <none>          19d   v1.28.15   192.168.147.129   <none>        Ubuntu 20.04.6 LTS 5.15.0-134-generic   con
tainerd://1.7.24
worker2-vm   Ready    <none>          19d   v1.28.15   192.168.147.130   <none>        Ubuntu 20.04.6 LTS 5.15.0-134-generic   con
tainerd://1.7.24
master@master-vm:~/Desktop/multi-tier-application/nginx$ kubectl get svc
NAME            TYPE       CLUSTER-IP       EXTERNAL-IP   PORT(S)        AGE
flask-service   ClusterIP  10.111.249.32    <none>        5000/TCP       2m21s
kubernetes      ClusterIP  10.96.0.1        <none>        443/TCP        19d
mysql           ClusterIP  10.100.136.170   <none>        3306/TCP       2m6s
nginx-service   NodePort   10.108.127.46    <none>        80:30007/TCP   73s
master@master-vm:~/Desktop/multi-tier-application/nginx$
```

Browser window:

`192.168.147.129:30007/`

Not Secure 192.168.147.129:30007

Hello from Flask with MySQL!

Terminal window: master@master-vm: ~/Desktop/multi-tier-application/mysql

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> CREATE DATABASE mydb;
ERROR 1007 (HY000): Can't create database 'mydb'; database exists
mysql> USE mydb;
Database changed
mysql> SHOW TABLES;
Empty set (0.01 sec)

mysql> CREATE TABLE users (
    ->     id INT AUTO_INCREMENT PRIMARY KEY,
    ->     name VARCHAR(100),
    ->     email VARCHAR(100)
    -> );
Query OK, 0 rows affected (0.02 sec)

mysql> INSERT INTO users (name, email) VALUES ('Alice', 'alice@example.com');
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO users (name, email) VALUES ('Bob', 'bob@example.com');
Query OK, 1 row affected (0.00 sec)

mysql> SELECT * FROM users;
+----+-------+-------------------+
| id | name  | email             |
+----+-------+-------------------+
|  1 | Alice | alice@example.com |
|  2 | Bob   | bob@example.com   |
+----+-------+-------------------+
2 rows in set (0.00 sec)

mysql>
```