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Assignment: 4.3

Firstly, we start single-node cluster using Minikube. It will create a virtual machine and configure it to run the kubernetes cluster locally

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
osamaabdulrazzak@all-MS-7035:~/Desktop/new_dataengineerign/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ minikube start
minikube v1.30.1 on Ubuntu 22.04
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 v1.26.3 on Docker 23.0.2 ...
Configuring bridge CNI (Container Networking Interface) ...
Verifying Kubernetes components...
  Using image docker.io/kubernetes/dashboard:v2.7.0
  Using image docker.io/kubernetes/metrics-scraper:v1.0.8
  Using image gcr.io/k8s-minikube/storage-provisioner:v5
Some dashboard features require the metrics-server addon. To enable all features please run:
  minikube addons enable metrics-server

Enabled addons: storage-provisioner, default-storageclass, dashboard
Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
```

Apply the kubernetes file for setting up a mongoDB deployment with mongo express and related service

```
osamaabdulrazzak@all-MS-7035:~/Desktop/new_dataengineerign/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongo-configmap.yaml
configmap/mongodb-configmap unchanged
osamaabdulrazzak@all-MS-7035:~/Desktop/new_dataengineerign/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongodb-
mongodb-deployment.yaml mongodb-service.yaml
osamaabdulrazzak@all-MS-7035:~/Desktop/new_dataengineerign/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongodb-deployment.yaml
deployment.apps/mongodb-deployment unchanged
osamaabdulrazzak@all-MS-7035:~/Desktop/new_dataengineerign/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongodb-service.yaml
error: the path "mongodb-service.yaml" does not exist
osamaabdulrazzak@all-MS-7035:~/Desktop/new_dataengineerign/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongo-express-deployment.yaml
deployment.apps/mongo-express unchanged
osamaabdulrazzak@all-MS-7035:~/Desktop/new_dataengineerign/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongo-express-service.yaml
service/mongo-express-service unchanged
osamaabdulrazzak@all-MS-7035:~/Desktop/new_dataengineerign/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongo-secret.yaml
secret/mongodb-secret unchanged
osamaabdulrazzak@all-MS-7035:~/Desktop/new_dataengineerign/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$
```

Display the information about the pods

```
osamaabdulrazzak@all-MS-7035:~/Desktop/new_dataengineerign/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
mongodb-deployment-85bbdc6549-k4nhz 1/1     Running   12 (14m ago)  22h
mongo-express-5bcd46fcff-lcrx7       1/1     Running   34 (13m ago)  22h
osamaabdulrazzak@all-MS-7035:~/Desktop/new_dataengineerign/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$
```

Display the information about services

```
(base) osamaabdulrazzak@all-MS-7035:~/Desktop/new_dataengineerign/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl get services
NAME            TYPE          CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
kubernetes      ClusterIP     10.96.0.1        <none>            443/TCP           3d19h
mongo-express-service LoadBalancer  10.108.113.110   192.168.0.10     8080:30001/TCP   22h
mongo-service   ClusterIP     10.109.147.18    <none>            27017/TCP         22h
```

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For describing the specific pod, we use following command

```

o3saaabdu1razzakal11-MS-7035:~/Desktop/new_dataengineering/data_engineering_bootcamp_2303/4_microservices_development/day_3_kubernetes/hands-on$ kubectl describe pod mongo-deployment-
Name:                mongo-deployment-85bbdc6549-k4nhz
Namespace:           default
Priority:             0
Service Account:     default
Node:                minikube/192.168.49.2
Start Time:          Fri, 12 May 2023 10:41:46 +0500
Labels:              app=mongodb
                    pod-template-hash=85bbdc6549
Annotations:         <none>
Status:              Running
IP:                  10.244.0.54
IPs:                
IP:                  10.244.0.54
Controlled By:       ReplicaSet/mongo-deployment-85bbdc6549
Containers:
  mongodb:
    Container ID:      docker://76cf0d8957b0163fecd2c908fa365adffdb30134fc443d201a7ac8b56db5d2
    Image:             docker-pullable://mongo@sha256:928347070dc089a596f869a22a4204c0face3eb03470a6a2de6814f11fb7309
    Image ID:          27017/TCP
    Port:              27017/TCP
    Host Port:         0/TCP
    State:              Running
      Started:          Sat, 13 May 2023 08:31:47 +0500
    Last State:         Terminated
      Reason:           Error
    Exit Code:          255
      Started:          Sat, 13 May 2023 08:28:43 +0500
      Finished:         Sat, 13 May 2023 08:31:19 +0500
    Ready:              True
    Restart Count:      12
    Environment:
      MONGO_INITDB_DATABASE:      admin
      MONGO_INITDB_ROOT_USERNAME: <set to the key 'mongo-root-username' in secret 'mongodb-secret'> Optional: false
      MONGO_INITDB_ROOT_PASSWORD: <set to the key 'mongo-root-password' in secret 'mongodb-secret'> Optional: false
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-l29d2 (ro)
Conditions:
  Type              Status
  Initialized        True
  Ready              True
  ContainersReady    True
  PodScheduled       True
Volumes:
  kube-api-access-l29d2:
    Type:              Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds: 3607
    ConfigMapName:      kube-root-ca.crt

```

For describing specific logs, we use the following command

[illegible]

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To access a service running on Minikube, we use the following command

```
osamaabulrazzak@ali-MS-7035:~/Desktop/new_dataengineerign/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ minikube service mongo-express-service
```

NAMESPACE	NAME	TARGET PORT	URL
default	mongo-express-service	8080	http://192.168.49.2:30001

Starting tunnel for service mongo-express-service.

NAMESPACE	NAME	TARGET PORT	URL
default	mongo-express-service		http://127.0.0.1:45649

Opening service default/mongo-express-service in default browser...

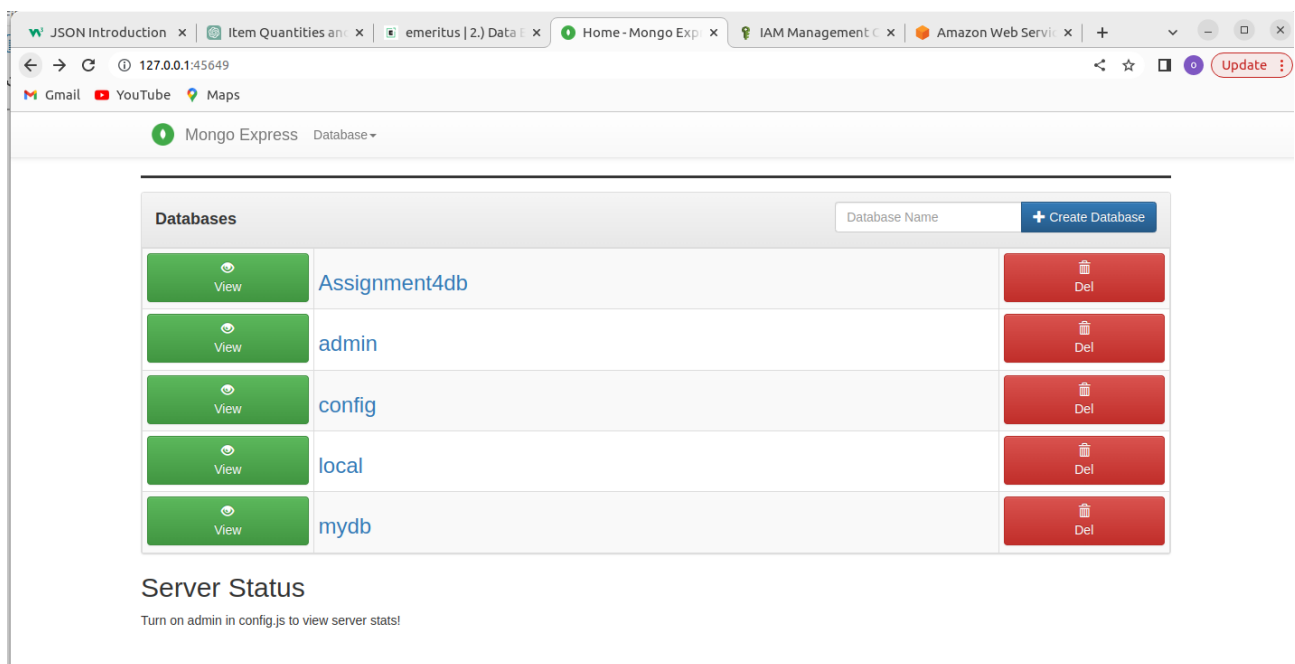
Failed to load module: /home/osamaabulrazzak/snap/code/common/.cache/gio-modules/libgiolibproxy.so

! Because you are using a Docker driver on linux, the terminal needs to be open to run it.

Opening in existing browser session.

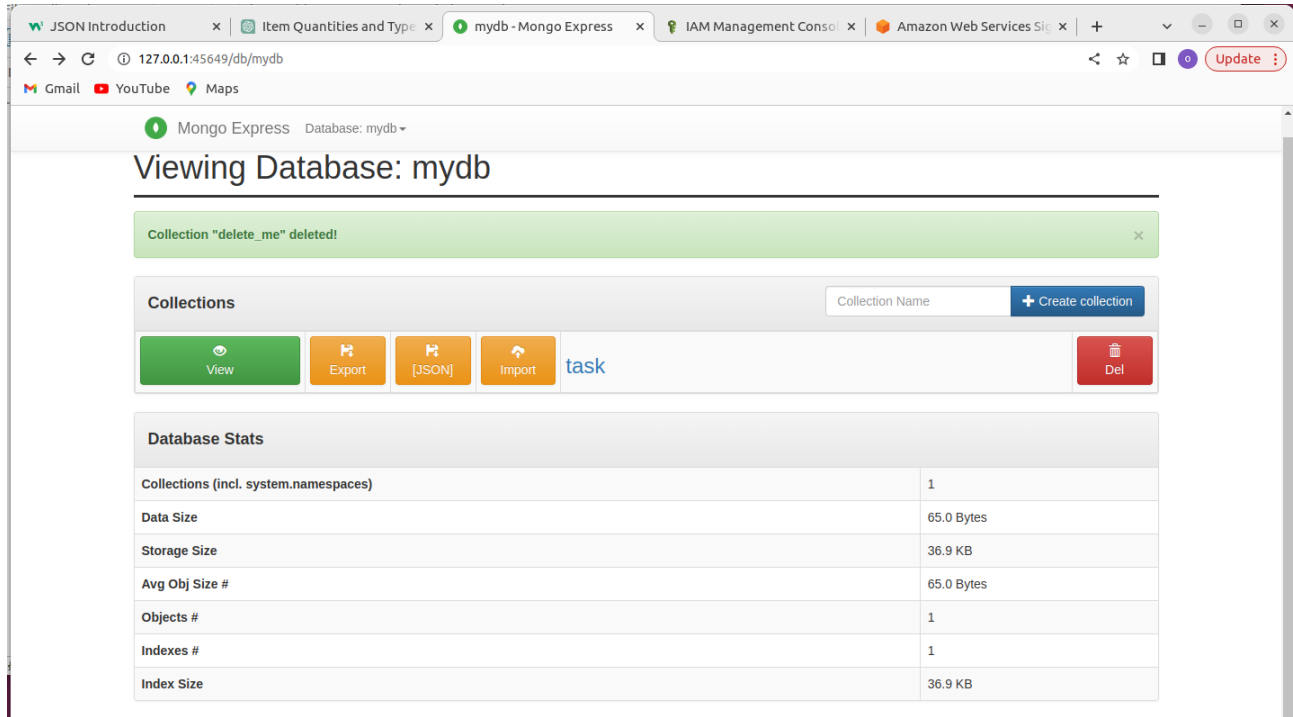
MESA-INTEL: warning: Performance support disabled, consider sysctl dev.i915.perf_stream_paranoid=0

and then we navigate to mongo service url
and create the new database 'mydb'



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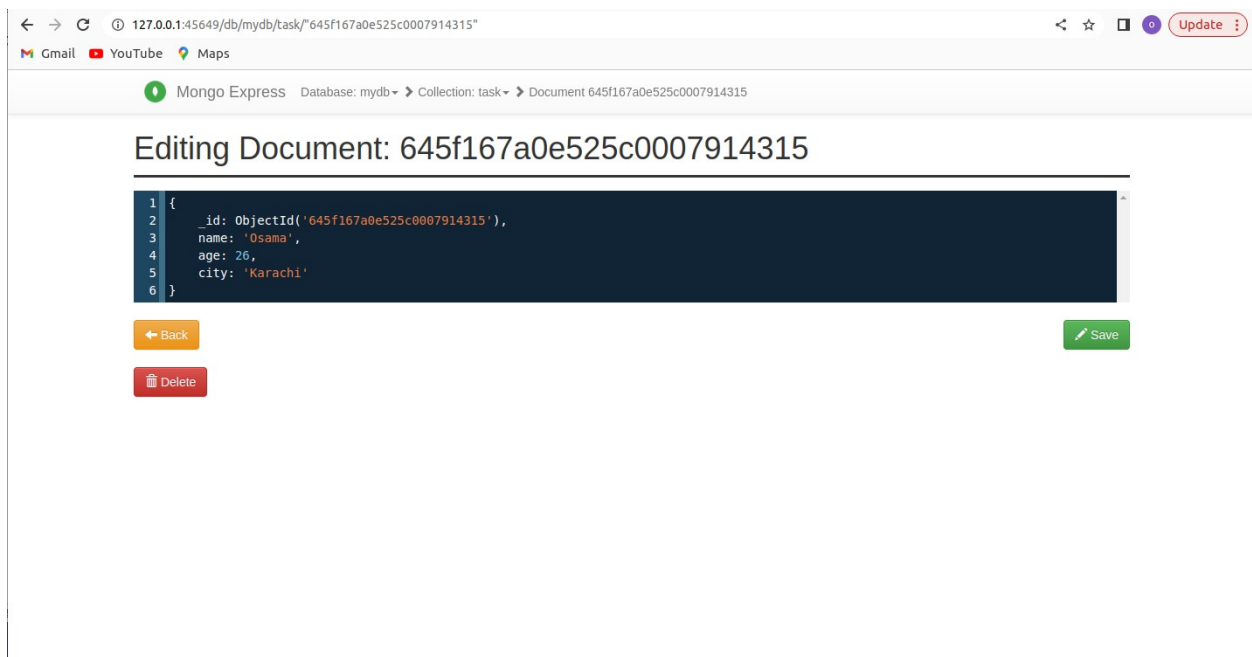
and create collection 'task_1' in it



The screenshot shows the Mongo Express web interface in a browser. The address bar indicates the URL is 127.0.0.1:45649/db/mydb. The page title is "Mongo Express Database: mydb". The main heading is "Viewing Database: mydb". A green notification bar at the top says "Collection 'delete_me' deleted!". Below this, there's a "Collections" section with a search bar and a "+ Create collection" button. A table lists the collections, with "task" highlighted. The table has buttons for "View", "Export", "[JSON]", "Import", and "Del". Below the collections list is a "Database Stats" table.

Database Stats	
Collections (incl. system.namespaces)	1
Data Size	65.0 Bytes
Storage Size	36.9 KB
Avg Obj Size #	65.0 Bytes
Objects #	1
Indexes #	1
Index Size	36.9 KB

Edit the document



The screenshot shows the Mongo Express web interface in a browser. The address bar indicates the URL is 127.0.0.1:45649/db/mydb/task/645f167a0e525c0007914315. The page title is "Mongo Express Database: mydb > Collection: task > Document 645f167a0e525c0007914315". The main heading is "Editing Document: 645f167a0e525c0007914315". Below this, there's a code editor with the following JSON document:

```
1 {
2   _id: ObjectId('645f167a0e525c0007914315'),
3   name: 'Osama',
4   age: 26,
5   city: 'Karachi'
6 }
```

Below the code editor, there are three buttons: "Back", "Save", and "Delete".

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then enter into the pod and move into mongo shell environment by typing Mongosh and write no sql query for accessing collection

```
osamaabduirazzak@all-MS-7035:~/desktop/new_dataengineerign/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl exec -it mongo-deployment-85bdc6549-k4nhz -- /bin/bash
root@mongo-deployment-85bdc6549-k4nhz:/# mongosh -u $MONGO_INITDB_ROOT_USERNAME -p $MONGO_INITDB_ROOT_PASSWORD --authenticationDatabase admin
Current Mongosh Log ID: 645f1512e4ee13ac2ba21a1e
Connecting to:      mongodb://<credentials>@127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000&authSource=admin&appName=mongosh+1.8.2
Using MongoDB:      6.0.5
Using Mongosh:      1.8.2

For mongosh info see: https://docs.mongodb.com/mongodb-shell/

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The server generated these startup warnings when booting
2023-05-13T03:31:55.838+00:00: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine. See http://dochub.mongodb.org/core/prodnotes-filesystem
2023-05-13T03:31:56.233+00:00: vm.max_map_count is too low
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Enable MongoDB's free cloud-based monitoring service, which will then receive and display
metrics about your deployment (disk utilization, CPU, operation statistics, etc).

The monitoring data will be available on a MongoDB website with a unique URL accessible to you
and anyone you share the URL with. MongoDB may use this information to make product
improvements and to suggest MongoDB products and deployment options to you.

To enable free monitoring, run the following command: db.enableFreeMonitoring()
To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
-----

test> use mydb
switched to db mydb
mydb> db.task.find()
[ { _id: ObjectId("645f15d3e0e01612d300446") } ]
mydb> db.task.find()
[
  {
    _id: ObjectId("645f15d3e0e01612d300446"),
    {
      _id: ObjectId("645f167a0e525c0007914315"),
      name: 'Osama',
      age: 26,
      city: 'Karachi'
    }
  }
]
mydb> []
```

we successfully access the collection