

NAME: Mohammad Hussam (2303.KHI.DEG.020)

PAIRING WITH : MAVIA ALAM KHAN (2303.KHI.DEG.017)

&

AQSA TAUHEED(2303.KHI.DEG.011)

ASSIGNMENT NO : 4.3

```
(base) mavialamkhan@all-MS-7D35:~$ minikube start
W0515 08:41:31.014220 24133 main.go:291] Unable to resolve the current Docker
CLI context "default": context "default" does not exist
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 gcr.io/k8s-minikube/storage-provisioner:v5
  ■ Enabled addons: storage-provisioner, default-storageclass
  ■ Done! kubectl is now configured to use "minikube" cluster and "default" name
  space by default
```

minikube start is used to start a local Kubernetes cluster using Minikube. Minikube is a tool that allows you to run a single-node Kubernetes cluster on your local machine for development and testing purposes. When you run the minikube start command, it sets up and starts a virtual machine that hosts the Kubernetes cluster.

```
(base) mavialamkhan@all-MS-7D35:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongo-secret.yaml
secret/mongodb-secret created
(base) mavialamkhan@all-MS-7D35:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongo-configmap.yaml
configmap/mongodb-configmap created
(base) mavialamkhan@all-MS-7D35:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongo-express-deployment.yaml
deployment.apps/mongo-express created
(base) mavialamkhan@all-MS-7D35:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongo-express-service.yaml
service/mongo-express-service created
(base) mavialamkhan@all-MS-7D35:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongodb-deployment.yaml
deployment.apps/mongo-deployment created
(base) mavialamkhan@all-MS-7D35:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongodb-service.yaml
service/mongo-service created
```

Now we break down the command and its purpose:

kubectl: It is the command-line tool used to interact with Kubernetes clusters.

apply: This command is used to create or update resources in a cluster based on the configuration provided.

-f mongo-secret.yaml: The -f flag indicates that the configuration is specified in a file.

```
(base) maviaalankhangall@MS-7035:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl get deployments
NAME          READY   UP-TO-DATE   AVAILABLE   AGE
mongo-deployment 1/1     1             1           81s
mongo-express  0/1     0             0           6m30s
(base) maviaalankhangall@MS-7035:~/Documents/usama_git_repo/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           45h
mongo-express-service LoadBalancer  10.102.171.116   192.168.0.10     8080:30001/TCP   2m4s
mongo-service  ClusterIP     10.108.30.24     <none>            27017/TCP         67s
(base) maviaalankhangall@MS-7035:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
mongo-deployment-85bbdc6549-vltrv 1/1     Running   0           105s
mongo-express-5bcd46cfff-bbkbsb 1/1     Running   0 (2m49s ago) 6m54s
(base) maviaalankhangall@MS-7035:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl describe service mongo-express-service
Name:          mongo-express-service
Namespace:     default
Labels:        <none>
Annotations:   <none>
Selector:      app=mongo-express
Type:          LoadBalancer
IP Family Policy: SingleStack
IP Families:   IPv4
IP:            10.102.171.116
IPs:           10.102.171.116
External IPs:  192.168.0.10
Port:          <unset> 8080/TCP
TargetPort:    8081/TCP
NodePort:      <unset> 30001/TCP
Endpoints:     10.244.0.4:8081
Session Affinity: None
External Traffic Policy: Cluster
Events:        <none>
(base) maviaalankhangall@MS-7035:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
mongo-deployment-85bbdc6549-vltrv 1/1     Running   0           3m11s
mongo-express-5bcd46cfff-bbkbsb 1/1     Running   0 (4m15s ago) 8m20s
```

`kubectl get deployments`, it sends a request to the Kubernetes API server to retrieve a list of all the deployments in the current context or namespace.

`kubectl get services`, you will receive a tabular representation of the services in your cluster the cluster IP address, and the ports exposed by the service.

`kubectl get pods` allowing you to monitor their status, resource usage

`kubectl describe service` command provides a detailed overview of the specified service, including its configuration, status, and associated resources. It is useful for troubleshooting, verifying the service's setup, and understanding its connectivity within the cluster and to external entities.

```
(base) maviaalankhangall@MS-7035:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl logs mongo-deployment-85bbdc6549-vltrv
about to fork child process, waiting until server is ready for connections.
forked process: 28

{"t":{"$date":"2023-05-15T03:54:13.371+00:00"},"s":"I",  "c":"CONTROL",  "id":20698,   "ctx":"","msg":"***** SERVER RESTARTED *****"}
{"t":{"$date":"2023-05-15T03:54:13.372+00:00"},"s":"I",  "c":"CONTROL",  "id":23285,   "ctx":"","msg":"Automatically disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2023-05-15T03:54:13.372+00:00"},"s":"I",  "c":"NETWORK",  "id":4915701, "ctx":"","msg":"Initialized wire specification","attr":{"spec":{"incomingExternalClient":{"minWireVersion":0,"maxWireVersion":17},"incomingInternalClient":{"minWireVersion":0,"maxWireVersion":17},"outgoing":{"minWireVersion":6,"maxWireVersion":17},"isInternalClient":true}}}}
{"t":{"$date":"2023-05-15T03:54:13.373+00:00"},"s":"I",  "c":"NETWORK",  "id":4648001, "ctx":"main", "msg":"Implicit TCP FastOpen unavailable. If TCP FastOpen is required, set tcpFastOpenServer, tcpFastOpenClient, and tcpFastOpenQueueSize."}
{"t":{"$date":"2023-05-15T03:54:13.374+00:00"},"s":"I",  "c":"REPL",       "id":5123008, "ctx":"main", "msg":"Successfully registered PrimaryOnlyService","attr":{"service":"TenantMigrationDonorService","namespace":"config.tenantMigrationDonors"}}
{"t":{"$date":"2023-05-15T03:54:13.374+00:00"},"s":"I",  "c":"REPL",       "id":5123008, "ctx":"main", "msg":"Successfully registered PrimaryOnlyService","attr":{"service":"TenantMigrationRecipientService","namespace":"config.tenantMigrationRecipients"}}
{"t":{"$date":"2023-05-15T03:54:13.374+00:00"},"s":"I",  "c":"REPL",       "id":5123008, "ctx":"main", "msg":"Successfully registered PrimaryOnlyService","attr":{"service":"ShardSplitDonorService","namespace":"config.tenantSplitDonors"}}
{"t":{"$date":"2023-05-15T03:54:13.374+00:00"},"s":"I",  "c":"CONTROL",  "id":5945603, "ctx":"main", "msg":"Multi threading initialized"}
{"t":{"$date":"2023-05-15T03:54:13.374+00:00"},"s":"I",  "c":"CONTROL",  "id":4615011, "ctx":"initandlisten", "msg":"MongoDB starting","attr":{"pid":28,"port":27017,"dbPath":"/data/db","architecture":"64-bit","host":"mongo-deployment-85bbdc6549-vltrv"}}
{"t":{"$date":"2023-05-15T03:54:13.374+00:00"},"s":"I",  "c":"CONTROL",  "id":23403,   "ctx":"initandlisten", "msg":"Build Info","attr":{"buildInfo":{"version":"6.0.5","gitVersion":"c9a99c120371d4d4c52cbb15dac34a30ce8d3b1d","openSSLVersion":"OpenSSL 3.0.2 15 Mar 2022","modules":[],"allocator":"tcmalloc","environment":{"distmod":"ubuntu2004","distarch":"x86_64","targetarch":"x86_64"}}}}
{"t":{"$date":"2023-05-15T03:54:13.374+00:00"},"s":"I",  "c":"CONTROL",  "id":51765,   "ctx":"initandlisten", "msg":"Operating System","attr":{"os":{"name":"Ubuntu","version":"22.04"}}}
{"t":{"$date":"2023-05-15T03:54:13.374+00:00"},"s":"I",  "c":"CONTROL",  "id":21951,   "ctx":"initandlisten", "msg":"Options set by command line","attr":{"options":{"net":{"bindIp":"127.0.0.1","port":27017,"tls":{"mode":"disabled"},"processManagement":{"fork":true,"pidFilePath":"/tmp/docker-entrypoint-temp-mongod.pid"},"systemLog":{"destination":"file","logAppend":true,"path":"/proc/1/fd/1"}}}}}
{"t":{"$date":"2023-05-15T03:54:13.375+00:00"},"s":"I",  "c":"STORAGE",  "id":22297,   "ctx":"initandlisten", "msg":"Using the XFS filesystem is strongly recommended with the WiredTiger storage engine. See http://docs.mongodb.org/core/products/enterprise-filestorage/"}
{"t":{"$date":"2023-05-15T03:54:13.375+00:00"},"s":"I",  "c":"STORAGE",  "id":22315,   "ctx":"initandlisten", "msg":"Opening WiredTiger","attr":{"config":{"create,cache_size=15442M,session_max=3000,eviction=(threads_min=4,threads_max=4),config_base=false,statistics=(fast),log=(enabled=true,remove=true,path=journal,compressor=snappy),builtin extension config=(zstd=(compression level=6),file_manager=(close_idle_time=600,close_scan_interval=10,close_handle_minimum=2000),statistics_log=(wait=0),json_output=(error,message),verbose=[recovery progress:1,checkpoint progress:1,compact progress:1,backup:0,checkpoint:0,compact:0,evict:0,history_store:0,recovery:0,rts:0,salvage:0,tiered:0,tiered:0,timestamp:0,transaction:0,verify:0,log:0],)}}}}
{"t":{"$date":"2023-05-15T03:54:13.481+00:00"},"s":"I",  "c":"STORAGE",  "id":4795906, "ctx":"initandlisten", "msg":"WiredTiger opened","attr":{"durationMillis":106}}
{"t":{"$date":"2023-05-15T03:54:13.481+00:00"},"s":"I",  "c":"RECOVERY",  "id":23987,   "ctx":"initandlisten", "msg":"WiredTiger recoveryTimestamp","attr":{"recoveryTimestamp":{"timestamp":"0","i":0}}}}
{"t":{"$date":"2023-05-15T03:54:13.490+00:00"},"s":"W",  "c":"CONTROL",  "id":22120,   "ctx":"initandlisten", "msg":"Access control is not enabled for the database. Read and write access to data and configuration is unrestricted","tags":{"startupWarnings":true}}
{"t":{"$date":"2023-05-15T03:54:13.491+00:00"},"s":"W",  "c":"CONTROL",  "id":5123008, "ctx":"initandlisten", "msg":"vm.max map count is too low","attr":{"currentValue":65530,"recommendedValue":16777216}}
```

`kubectl logs mongo-deployment-85bbdc6549-tgv79` allows you to view the specific pod's logs, which can help you diagnose issues, monitor application behavior, and gather insights into the execution of the containerized application within the pod.

```
(base) maviaalankhangall@MS-7035:~/Documents/usama_git_repo/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           45h
mongo-express-service LoadBalancer  10.102.171.116   192.168.0.10     8080:30001/TCP   6m34s
mongo-service  ClusterIP     10.108.30.24     <none>            27017/TCP         5m37s
(base) maviaalankhangall@MS-7035:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ minikube service mongo-express-service
W0515 09:30:30.188591 54587 main.go:291] Unable to resolve the current Docker CLI context "default": context "default" does not exist

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

$ Opening service default/mongo-express-service in default browser...
$ /snap/core20/current/lib/x86_64-linux-gnu/libstdc++.so.6 version 'GLIBCXX_3.4.29' not found (required by /lib/x86_64-linux-gnu/libproxy.so.1)
Failed to load module: /home/maviaalankhang/snap/code/common/.cache/gio/modules/libgiolibraryproxy.so
(base) maviaalankhangall@MS-7035:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ /snap/core20/current/lib/x86_64-linux-gnu/libstdc++.so.6: version 'GLIBCXX_3.4.29' not found (required by /lib/x86_64-linux-gnu/libproxy.so.1)
Failed to load module: /home/maviaalankhang/snap/code/common/.cache/gio/modules/libgiolibraryproxy.so
Opening in existing browser session.
(base) maviaalankhangall@MS-7035:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$
```

minikube service mongo-express-service deployed on a remote server. This allows you to test, validate, and interact with the service using the full functionality of the application or interface exposed by the service.

```
• (base) mavialamkhan@all-MS-7035:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl exec mongo-deployment-85bbdc6549-vltrv -- /bin/bash
error: unknown flag: --/bin/bash
See 'kubectl exec --help' for usage.
• (base) mavialamkhan@all-MS-7035:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl exec -f mongo-deployment-85bbdc6549-vltrv -- /bin/bash
error: unknown flag: --/bin/bash
See 'kubectl exec --help' for usage.
• (base) mavialamkhan@all-MS-7035:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
mongo-deployment-85bbdc6549-vltrv   1/1     Running   0           24m
mongo-express-5bcd46fcff-bbksb      1/1     Running   6 (25m ago) 29m
• (base) mavialamkhan@all-MS-7035:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl exec -it mongo-deployment-85bbdc6549-vltrv -- /bin/bash
root@mongo-deployment-85bbdc6549-vltrv:/# maviainloop
bash: maviainloop: command not found
root@mongo-deployment-85bbdc6549-vltrv:/# mongosh -u $MONGO_INITDB_ROOT_USERNAME -p $MONGO_INITDB_ROOT_PASSWORD
Current Mongosh Log ID: 6461b2ee5743a06cd71b7469
Connecting to:      mongodb://<credentials>@127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000&appName=mongosh+1.8.2
Using MongoDB:      6.0.5
Using Mongosh:      1.8.2

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

To help improve our products, anonymous usage data is collected and sent to MongoDB periodically (https://www.mongodb.com/legal/privacy-policy).
You can opt-out by running the disableTelemetry() command.

-----
The server generated these startup warnings when booting
2023-05-15T03:54:16.467+00:00: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine. See http://dochub.mongodb.org/core/prodnotes-filesystem
2023-05-15T03:54:16.772+00:00: vm.max_map_count is too low
-----

-----
Enable MongoDB's free cloud-based monitoring service, which will then receive and display
-----

test> use mavia_collection
switched to db mavia_collection
mavia_collection> show collections

mavia_collection> db.mavia_collection.find().pretty()

mavia_collection> []

-----

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

-----

test> use hussam_collection
switched to db hussam_collection
hussam_collection> show collection

-----

test> use aqsa_collection
switched to db aqsa_collection
aqsa_collection> show collections
delete_me
aqsa_collection> show collections
delete_me
aqsa_collection> []
```

Databases		Database Name	+ Create Database
<div>View</div>	admin	<div>Del</div>	
<div>View</div>	aqsa	<div>Del</div>	
<div>View</div>	aqsa_collection	<div>Del</div>	
<div>View</div>	config	<div>Del</div>	
<div>View</div>	hussam	<div>Del</div>	
<div>View</div>	local	<div>Del</div>	
<div>View</div>	mavia	<div>Del</div>	

Viewing Collection: mavia_collection

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Simple

Advanced

String

Find

Delete all 1 documents retrieved

_id	employee
 6461afb2113efd0007bcc507	<pre>{ "name": "sonoo", "salary": 56000, "married": true }</pre>

Viewing Collection: hussam_collection

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Simple

Advanced

String

Find

Delete all 1 documents retrieved

_id	employee
 6461b555113efd0007bcc508	<pre>{ "name": "sonoo", "salary": 56000, "married": true }</pre>

Viewing Collection: aqsa_collection

[New Document](#) [New Index](#)


Simple

Advanced

String

Find

Delete all 1 documents retrieved

_id	employee
 6461b7d2113efd0007bcc50a	<pre>{ "name": "sonoo", "salary": 56000, "married": true }</pre>