

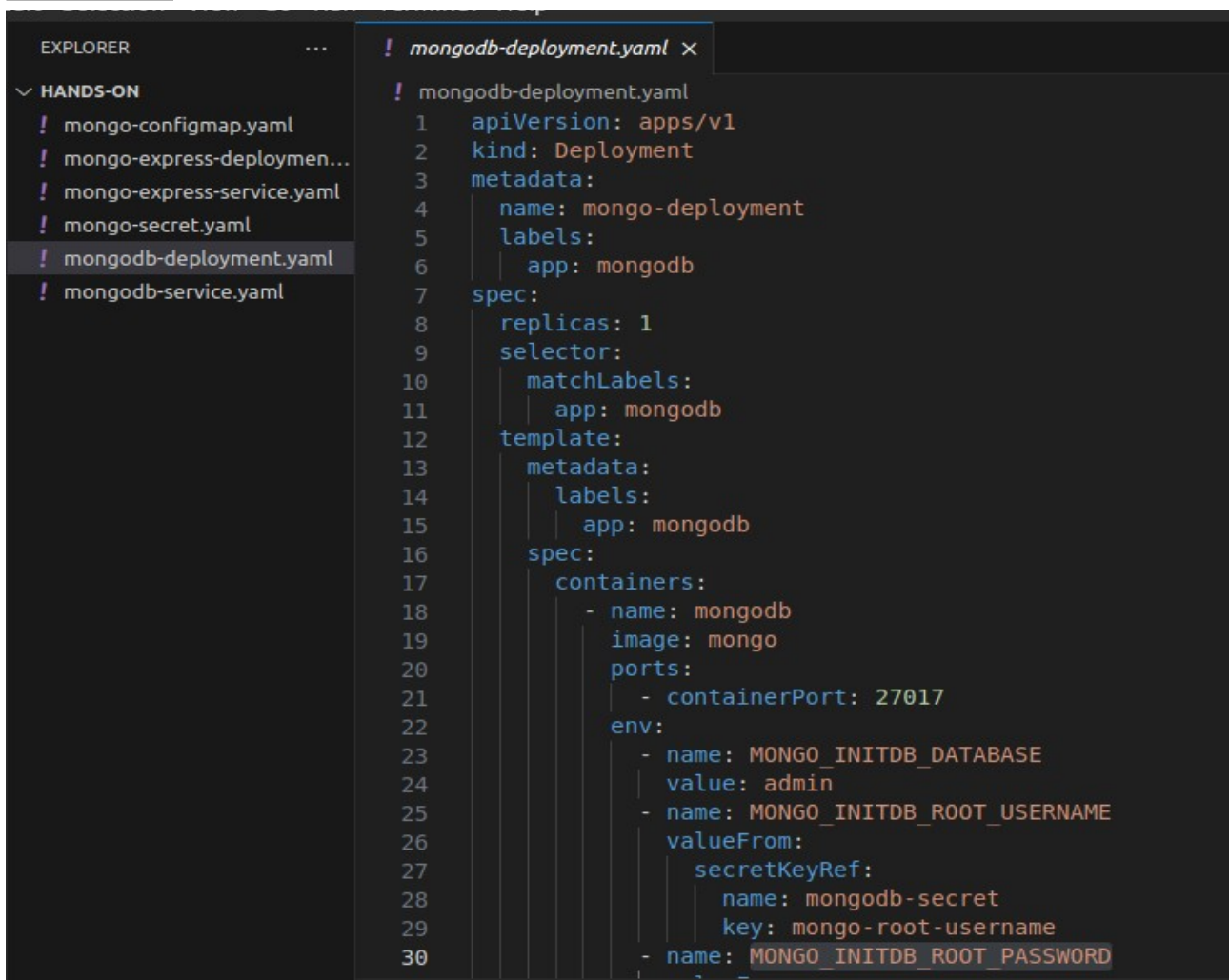
Unit 4.3 Graded Assignment:

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Daily Assignment :

Display logs of a running MongoDB container. Add a document to the DB via Mongo Express frontend. Get into the pod and verify the document's existence via *mongosh*.

Answer:



```
! mongodb-deployment.yaml x
! mongodb-deployment.yaml
1  apiVersion: apps/v1
2  kind: Deployment
3  metadata:
4    name: mongo-deployment
5    labels:
6      app: mongodb
7  spec:
8    replicas: 1
9    selector:
10     matchLabels:
11       app: mongodb
12    template:
13     metadata:
14       labels:
15         app: mongodb
16     spec:
17       containers:
18         - name: mongodb
19           image: mongo
20           ports:
21             - containerPort: 27017
22           env:
23             - name: MONGO_INITDB_DATABASE
24               value: admin
25             - name: MONGO_INITDB_ROOT_USERNAME
26               valueFrom:
27                 secretKeyRef:
28                   name: mongodb-secret
29                   key: mongo-root-username
30             - name: MONGO_INITDB_ROOT_PASSWORD
```

mongodb-configmap.yaml: This file is a Kubernetes ConfigMap, that stores a single key-value pair, where the key is "database_url" and the value is "mongo-service". This ConfigMap can be used to provide the

configuration data for applications or services running in the Kubernetes cluster.

mongo-express-deployment.yaml: This file represents a Kubernetes Deployment, that manages a single replica of a container running the "mongo-express" image. The container listens on port 8081 and has environment variables set using values obtained from a Secret (mongodb-secret) and a ConfigMap (mongodb-configmap). This Deployment can be used to deploy and manage instances of the "mongo-express" application within a Kubernetes cluster.

mongo-express-service.yaml: This yaml file represents a Kubernetes Service, that selects pods labeled with "app: mongo-express". The Service is of type LoadBalancer and has an external IP address assigned to it. It listens on port 8080 and forwards incoming traffic to the pods on port 8081. Additionally, the Service is externally accessible on node port 30001. This Service allows external traffic to reach the pods running the "mongo-express" application within the Kubernetes cluster.

mongo-secret.yaml: This code file is represents a Kubernetes Secret , is that stores two sensitive key-value pairs: "mongo-root-username" with the value "username" and "mongo-root-password" with the value "password". These values are Base64 encoded for storage in the Secret. The Secret can be used to securely provide the MongoDB root username and password to applications or services running in the Kubernetes cluster.

mongodb-deployment.yaml: This yaml code file represents a Kubernetes Deployment ,that manages a single replica of a container running the "mongo" image. The container listens on port 27017, which is the default MongoDB port. Environment variables are set, including the database name, MongoDB root username, and MongoDB root password, with the latter two values obtained from a Secret named "mongodb-secret". This Deployment can be used to deploy and manage instances of the MongoDB database within a Kubernetes cluster.

mongodb-service.yaml: This code represents a Kubernetes Service , that routes incoming TCP traffic on port 27017 to pods labeled with "app: mongodb". This allows external clients or other services within the cluster to communicate with the pods running the MongoDB application using the specified port. The Service provides a stable endpoint for accessing the MongoDB service, abstracting away the dynamic nature of the pods.

```
(base) qadeerhussain@all-MS-7035:~/Qadeer/Training/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 ...
Updating the running docker "minikube" container ...
Preparing Kubernetes v1.26.3 on Docker 23.0.2 ...
Verifying Kubernetes components...
  Using image gcr.io/k8s-minikube/storage-provisioner:v5
Enabled addons: storage-provisioner, default-storageclass
kubectl not found. If you need it, try: 'minikube kubectl -- get pods -A'
Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
(base) qadeerhussain@all-MS-7035:~/Qadeer/Training/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl get all
Command "kubectl" not found, but can be installed with:
sudo snap install kubectl
(base) qadeerhussain@all-MS-7035:~/Qadeer/Training/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl get all
NAME                                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
service/kubernetes                  ClusterIP           10.96.0.1        <none>            443/TCP           2d19h
(base) qadeerhussain@all-MS-7035:~/Qadeer/Training/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongo-configmap.yaml
configmap/mongodb-configmap created
(base) qadeerhussain@all-MS-7035:~/Qadeer/Training/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) qadeerhussain@all-MS-7035:~/Qadeer/Training/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) qadeerhussain@all-MS-7035:~/Qadeer/Training/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongo-secret.yaml
secret/mongodb-secret created
(base) qadeerhussain@all-MS-7035:~/Qadeer/Training/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) qadeerhussain@all-MS-7035:~/Qadeer/Training/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl apply -f mongodb-service.yaml
service/mongo-service created
(base) qadeerhussain@all-MS-7035:~/Qadeer/Training/data_engineering_bootcamp_2303/tasks/4
(base) qadeerhussain@all-MS-7035:~/Qadeer/Training/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           29m
mongo-express                        1/1     1             1           30m
(base) qadeerhussain@all-MS-7035:~/Qadeer/Training/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           2d20h
mongo-express-service                LoadBalancer        10.107.148.39    192.168.0.10     8080:30001/TCP   30m
mongo-service                        ClusterIP            10.97.7.78       <none>            27017/TCP         29m
(base) qadeerhussain@all-MS-7035:~/Qadeer/Training/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
mongo-deployment-85bbdc6549-cdfxd   1/1     Running   0           29m
mongo-express-5bcd46fcff-9qzpz      1/1     Running   3 (29m ago)  30m
(base) qadeerhussain@all-MS-7035:~/Qadeer/Training/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
IPs:                               10.107.148.39
External IPs:                       192.168.0.10
Port:                              <unset> 8080/TCP
TargetPort:                         8081/TCP
NodePort:                           <unset> 30001/TCP
Endpoints:                          10.244.0.5:8081
Session Affinity:                   None
External Traffic Policy:            Cluster
Events:                             <none>
(base) qadeerhussain@all-MS-7035:~/Qadeer/Training/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
mongo-deployment-85bbdc6549-cdfxd   1/1     Running   0           30m
mongo-express-5bcd46fcff-9qzpz      1/1     Running   3 (30m ago)  31m
(base) qadeerhussain@all-MS-7035:~/Qadeer/Training/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl logs mongo-deployment-85bbdc6549-cdfxd
about to fork child process, waiting until server is ready for connections.
forked process: 28
{"t":{"$date":"2023-05-12T04:10:20.055+00:00"},"s":"I",  "c":"CONTROL",  "id":20698,  "ctx":"","msg":"***** SERVER RESTARTED *****"}
{"t":{"$date":"2023-05-12T04:10:20.056+00:00"},"s":"I",  "c":"CONTROL",  "id":23285,  "ctx":"main","msg":"Automatically disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocol s none"}
{"t":{"$date":"2023-05-12T04:10:20.057+00:00"},"s":"I",  "c":"NETWORK",  "id":4915701, "ctx":"main","msg":"Initialized wire specification","attr":{"spec":{"incomingExternalClient":{"minWireVersion":0,"maxWireVersion":17},"incomingInternalClient":{"minWireVersion":0,"maxWireVersion":17},"outgoing":{"minWireVersion":6,"maxWireVersion":17},"isInternalClient":true}}}
{"t":{"$date":"2023-05-12T04:10:20.057+00:00"},"s":"I",  "c":"NETWORK",  "id":4648601, "ctx":"main","msg":"Implicit TCP FastOpen unavailable. If TCP FastOpen is required, set tcpFastOpenServer, tcpFastOpenClient, and tcpFastOpenQueueSize."}
{"t":{"$date":"2023-05-12T04:10:20.058+00:00"},"s":"I",  "c":"REPL",    "id":5123008, "ctx":"main","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"TenantMigrationDonorService","namespace":"config.tenantMigrationDonors"}}
{"t":{"$date":"2023-05-12T04:10:20.058+00:00"},"s":"I",  "c":"REPL",    "id":5123008, "ctx":"main","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"TenantMigrationRecipientService","namespace":"config.tenantMigrationRecipients"}}
{"t":{"$date":"2023-05-12T04:10:20.058+00:00"},"s":"I",  "c":"REPL",    "id":5123008, "ctx":"main","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"ShardSplitDonorService","namespace":"config.tenantSplitDonors"}}
{"t":{"$date":"2023-05-12T04:10:20.058+00:00"},"s":"I",  "c":"CONTROL",  "id":5945603, "ctx":"main","msg":"Multi threading initialized"}
{"t":{"$date":"2023-05-12T04:10:20.059+00:00"},"s":"I",  "c":"CONTROL",  "id":4615611, "ctx":"initandlisten","msg":"MongoDB starting","attr":{"pid":28,"port":27017,"dbPath":"/data/db","architecture":"64-bit","host":"mongo-deployment-85bbdc6549-cdfxd"}}
{"t":{"$date":"2023-05-12T04:10:20.059+00:00"},"s":"I",  "c":"CONTROL",  "id":23403,  "ctx":"initandlisten","msg":"Build Info","attr":{"buildInfo":{"version":"6.0.5","gitVersion":"c9a99c120371d44d52cbb15da34a36ce8b3d1","openSSLVersion":"OpenSSL 3.0.2 15 Mar 2022","modules":[],"allocator":"tcmalloc","environment":{"distmod":"ubuntu2204","distarch":"x86_64","target_arch":"x86_64"}}}}
{"t":{"$date":"2023-05-12T04:10:20.059+00:00"},"s":"I",  "c":"CONTROL",  "id":51765,  "ctx":"initandlisten","msg":"Operating System","attr":{"os":{"name":"Ubuntu","version":"22.04"}}}
{"t":{"$date":"2023-05-12T04:10:20.059+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":{"$date":"2023-05-12T04:10:20.059+00:00"},"s":"I",  "c":"STORAGE",  "id":22297,  "ctx":"initandlisten","msg":"Using the XFS filesystem is strongly recommended with the WiredTiger storage engine. See http://dochub.mongodb.org/core/prodnotes-filesystem","tags":{"startupWarnings":1}}
{"t":{"$date":"2023-05-12T04:10:20.059+00:00"},"s":"I",  "c":"STORAGE",  "id":22315,  "ctx":"initandlisten","msg":"Opening WiredTiger","attr":{"config":{"create,cache_size=15442M,session_max=33
```

```
a/db/diagnostic.data}}
{"t":{"sdate":"2023-05-12T04:10:23.591+00:00"},"s":"I", "c":"REPL", "id":6015317, "ctx":"initandlisten","msg":"Setting new configuration state","attr":{"newState":"ConfigReplicationDisable
d","oldState":"ConfigPreStart"}}
{"t":{"sdate":"2023-05-12T04:10:23.591+00:00"},"s":"I", "c":"STORAGE", "id":22262, "ctx":"initandlisten","msg":"Timestamp monitor starting"}
{"t":{"sdate":"2023-05-12T04:10:23.592+00:00"},"s":"I", "c":"NETWORK", "id":23015, "ctx":"listener","msg":"Listening on","attr":{"address":"/tmp/mongod-27017.sock"}}
{"t":{"sdate":"2023-05-12T04:10:23.592+00:00"},"s":"I", "c":"NETWORK", "id":23015, "ctx":"listener","msg":"Listening on","attr":{"address":"0.0.0.0"}}
{"t":{"sdate":"2023-05-12T04:10:23.592+00:00"},"s":"I", "c":"NETWORK", "id":23016, "ctx":"listener","msg":"Waiting for connections","attr":{"port":27017,"ssl":"off"}}
{"t":{"sdate":"2023-05-12T04:10:51.706+00:00"},"s":"I", "c":"NETWORK", "id":22943, "ctx":"listener","msg":"Connection accepted","attr":{"remote":"10.244.0.5:36700","uuiid":"78e11ba7-f7da-4cb
4-945d-f784d940e540","connectionId":1,"connectionCount":1}}
{"t":{"sdate":"2023-05-12T04:10:51.709+00:00"},"s":"I", "c":"NETWORK", "id":51800, "ctx":"conn1","msg":"client metadata","attr":{"remote":"10.244.0.5:36700","client":"conn1","doc":{"driver":
{"name":"nodejs","version":"3.7.3"},"os":{"type":"Linux","name":"Linux","architecture":"x64","version":"5.19.0-41-generic"},"platform":"Node.js v12.22.7, LE (legacy)}}}}
{"t":{"sdate":"2023-05-12T04:10:51.716+00:00"},"s":"I", "c":"ACCESS", "id":20250, "ctx":"conn1","msg":"Authentication succeeded","attr":{"mechanism":"SCRAM-SHA-256","speculative":true,"pri
ncipalName":"username","authenticationDatabase":"admin","remote":"10.244.0.5:36700","extraInfo":{}}}
(base) qadeerhussain@all-MS-7D35:~/Qadeer/Training/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          2d20h
mongo-express-service               LoadBalancer        10.107.148.39    192.168.0.10     8080:30001/TCP   32m
mongo-service                       ClusterIP            10.97.7.78       <none>            27017/TCP        31m
(base) qadeerhussain@all-MS-7D35:~/Qadeer/Training/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 |
|-----|-----|-----|-----|
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/libcrypto.so.1)
Failed to load module: /home/qadeerhussain/snap/code/common/.cache/gio-modules/libgiolibcrypto.so
```

Mongo Express

Database: qadeer_DB

Collection: qadeer

Viewing Collection: qadeer

Document added!

New Document

New Index

Simple

Advanced

Key

Value

String

Find

Delete all 1 documents retrieved

_id	id	first_name	last_name	email	gender	ip_address	
	645dd602d7d17e000729a72f	1	qadeer	hussain	qadeerhussain@gmail.com	Male	26.58.193.2

Rename Collection

qadeer_DB

qadeer

Rename

Tools

Export Standard

Export -jsonArray

Export -csv

Mongo Express

Database: qadeer_DB

Collection: qadeer

Document 645dd602d7d17e000729a72f

Editing Document: 645dd602d7d17e000729a72f

```
1 {
2   _id: ObjectId('645dd602d7d17e000729a72f'),
3   id: 1,
4   first_name: 'qadeer',
5   last_name: 'hussain',
6   email: 'qadeerhussain@gmail.com',
7   gender: 'Male',
8   ip_address: '26.58.193.2'
9 }
```

Back

Save

Delete

```

(base) qadeerhussain@ll-MS-7035:~/Qadeer/Training/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl exec -it mongo-deployment-85bdc6549
-cdfxd -- bash
root@mongo-deployment-85bdc6549-cdfxd:/# mongosh -u $MONGO_INITDB_ROOT_USERNAME -p $MONGO_INITDB_ROOT_PASSWORD
Current Mongosh Log ID: 645e103f422a44ff137f72a3
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
2023-05-12T04:10:23.306+00:00: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine. See http://dochub.mongodb.org/core/prodnotes-filesystem
2023-05-12T04:10:23.586+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 qadeer_DB
switched to db qadeer_DB
qadeer_DB> show collections
delete_me
qadeer
qadeer_DB> db.qadeer_DB_collection.find().pretty()

qadeer_DB> db.qadeer.find().pretty()
[
  {
    _id: ObjectId("645dd602d7d17e000729a72f"),
    id: 1,
    first_name: 'qadeer',
    last_name: 'hussain',
    email: 'qadeerhussain@gmail.com',
    gender: 'Male',
    ip_address: '26.58.193.2'
  }
]
qadeer_DB> 

```