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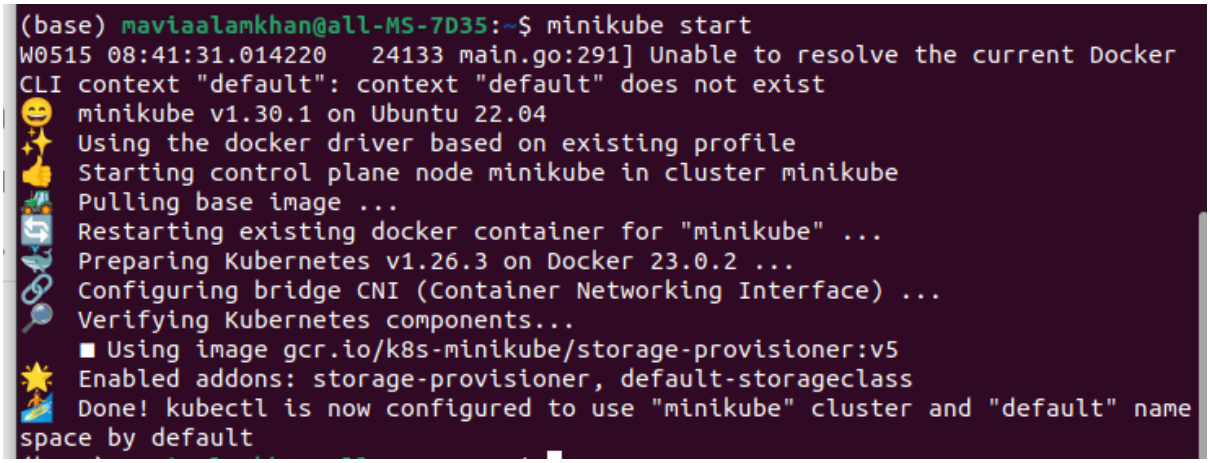
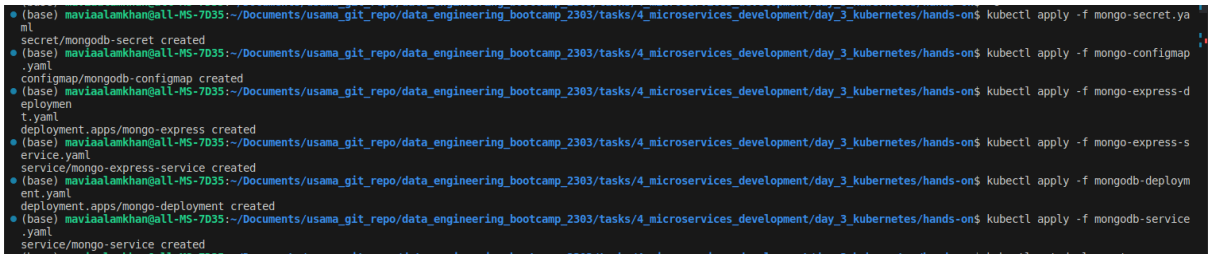


minikube start is used to start a local Kubernetes cluster using Minikube. Minikube is a tool that allows you to run a single-node Kubernetes cluster on your local machine for development and testing purposes. When you run the minikube start command, it sets up and starts a virtual machine that hosts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



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) maviaalamkhan@all-MS-7D35:~/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     1            0           6m30s
(base) maviaalamkhan@all-MS-7D35:~/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) maviaalamkhan@all-MS-7D35:~/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-5bcd46fcff-bbksb    1/1     Running   6 (2m49s ago)   6m54s
(base) maviaalamkhan@all-MS-7D35:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl describe service mongo-
xpress-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) maviaalamkhan@all-MS-7D35:~/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-5bcd46fcff-bbksb    1/1     Running   6 (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 he cluster IP address, and the ports exposed by the service.

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

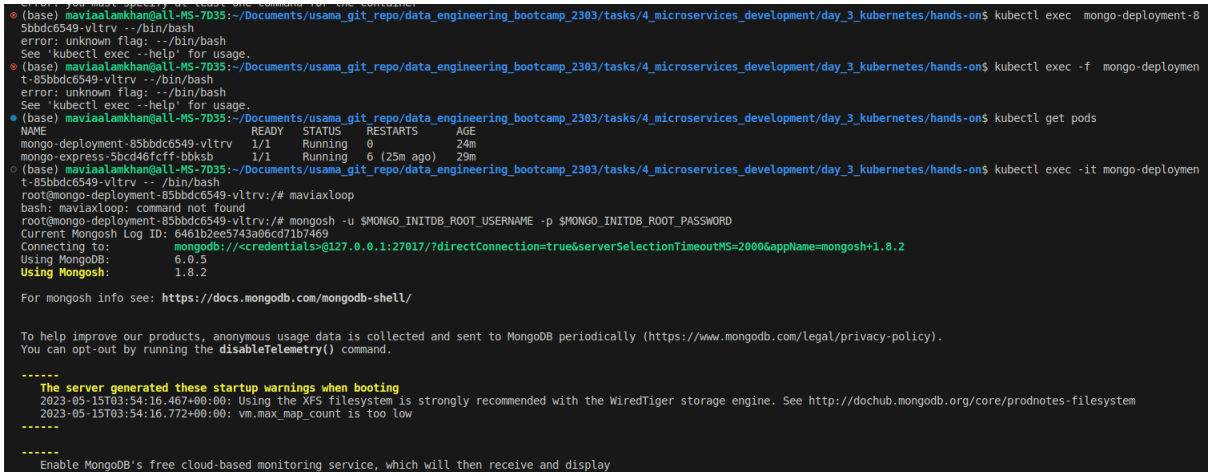
`kubectl describe service` command provides a detailed overview of the specified service, including its configuration, status, and associated resources. It is useful for troubleshooting, verifying the service's setup, and understanding its connectivity within the cluster and to external entities.

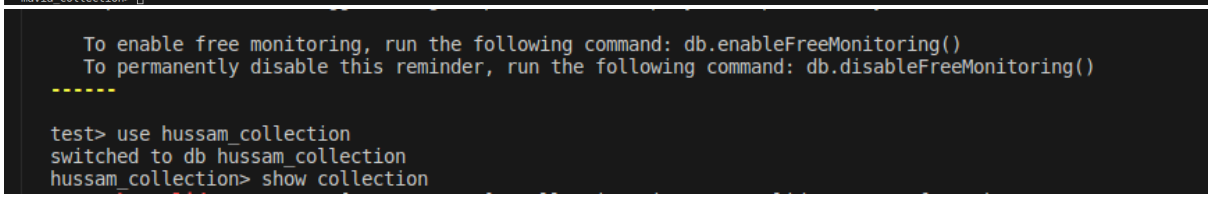
```
(base) maviaalamkhan@all-MS-7D35:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl logs mongo-deployment-85
bbdc6549-vltrv
about to fork child process, waiting until server is ready for connections.
forked process: 28

{"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 --sslDisabledPr
otocols 'none'"}
{"t":{"$date":"2023-05-15T03:54:13.372+00:00"},"s":"I",  "c":"NETWORK",  "id":4915701, "ctx":"-","msg":"Initialized wire specification","attr":{"spec":{"incomingExternalClient":{"minWi
reVersion":0,"maxWireVersion":17},"incomingInternalClient":{"minWireVersion":0,"maxWireVersion":17},"outgoing":{"minWireVersion":6,"maxWireVersion":17},"isInternalClient":true}}}
{"t":{"$date":"2023-05-15T03:54:13.373+00:00"},"s":"I",  "c":"NETWORK",  "id":4648601, "ctx":"main","msg":"Implicit TCP FastOpen unavailable. If TCP FastOpen is required, set tcpFastOp
enServer, tcpFastOpenClient, and tcpFastOpenQueueSize."}
{"t":{"$date":"2023-05-15T03:54:13.374+00:00"},"s":"I",  "c":"REPL",     "id":5123008, "ctx":"main","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"TenantMigratio
nDonorService","namespace":"config.tenantMigrationDonors"}}
{"t":{"$date":"2023-05-15T03:54:13.374+00:00"},"s":"I",  "c":"REPL",     "id":5123008, "ctx":"main","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"TenantMigratio
nRecipientService","namespace":"config.tenantMigrationRecipients"}}
{"t":{"$date":"2023-05-15T03:54:13.374+00:00"},"s":"I",  "c":"REPL",     "id":5123008, "ctx":"main","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"ShardSplitDono
rService","namespace":"config.tenantSplitDonors"}}
{"t":{"$date":"2023-05-15T03:54:13.374+00:00"},"s":"I",  "c":"CONTROL",  "id":5945603, "ctx":"main","msg":"Multi threading initialized"}
{"t":{"$date":"2023-05-15T03:54:13.374+00:00"},"s":"I",  "c":"CONTROL",  "id":4615611, "ctx":"initandlisten","msg":"MongoDB starting","attr":{"pid":28,"port":27017,"dbPath":"/data/db",
"architecture":"64-bit","host":"mongo-deployment-85bbdc6549-vltrv"}}
{"t":{"$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":"c9a
99c120371d4d4c52cbb15dac34a36ce8d3b1d","openSSLVersion":"OpenSSL 3.0.2 15 Mar 2022","modules":[],"allocator":"tcmalloc","environment":{"distmod":"ubuntu2204","distarch":"x86_64","targe
t_arch":"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":t
rue,"path":"/proc/1/fd/1"}}}}
{"t":{"$date":"2023-05-15T03:54:13.375+00:00"},"s":"I",  "c":"STORAGE",  "id":22297,   "ctx":"initandlisten","msg":"Using the XFS filesystem is strongly recommended with the WiredTiger
 storage engine. See http://dochub.mongodb.org/core/prodnotes-filesystem","tags":["startupWarnings"]}
{"t":{"$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,sessi
on_max=33000,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=(co
mpression_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,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":{"$timesta
mp":{"t":0,"i":0}}}}
{"t":{"$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 acces
s to data and configuration is unrestricted","tags":["startupWarnings"]}
{"t":{"$date":"2023-05-15T03:54:13.491+00:00"},"s":"W",  "c":"CONTROL",  "id":5123300, "ctx":"initandlisten","msg":"vm.max_map_count is too low","attr":{"currentValue":65530,"recommend
```

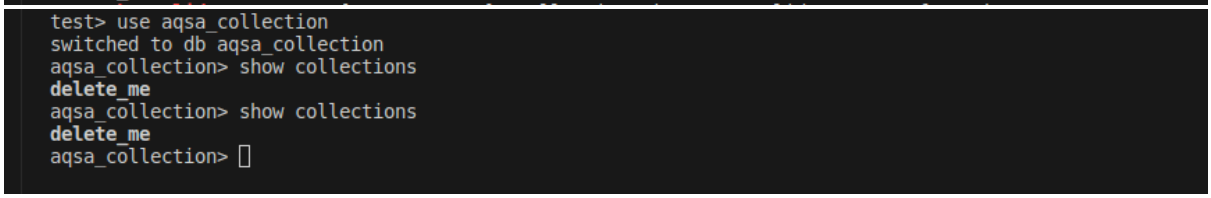
`kubectl logs mongo-deployment-85bbdc6549-tgv79` allows you to view the specific pod's logs, which can help you diagnose issues, monitor application behavior, and gather insights into the execution of the containerized application within the pod.

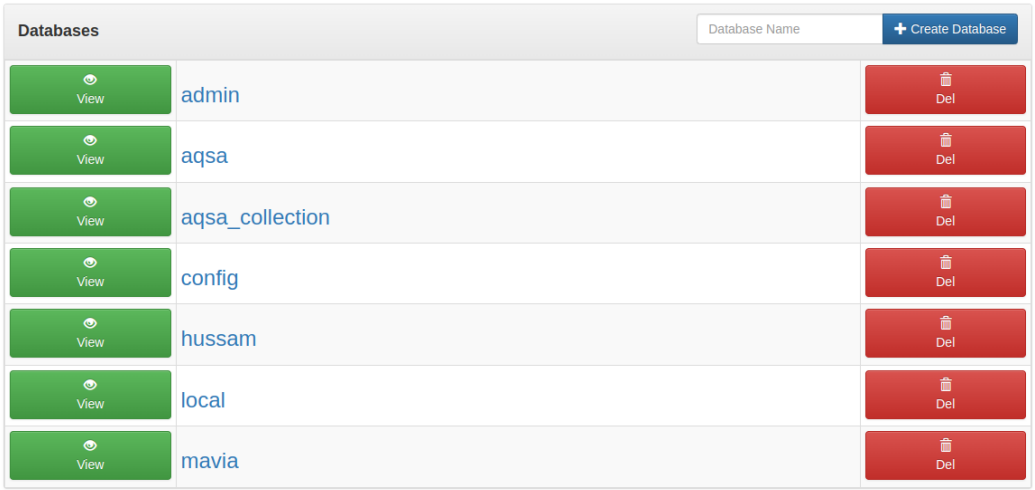
```
(base) maviaalamkhan@all-MS-7D35:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ kubectl get services
NAME                    TYPE           CLUSTER-IP       EXTERNAL-IP    PORT(S)          AGE
kubernetes              ClusterIP      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) maviaalamkhan@all-MS-7D35:~/Documents/usama_git_repo/data_engineering_bootcamp_2303/tasks/4_microservices_development/day_3_kubernetes/hands-on$ minikube service mongo-express-s
ervice
W0515 09:00:30.188591   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/maviaalamkhan/snap/code/common/.cache/gio-modules/libgiolibproxy.so
(base) maviaalamkhan@all-MS-7D35:~/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/maviaalamkhan/snap/code/common/.cache/gio-modules/libgiolibproxy.so
Opening in existing browser session.
(base) maviaalamkhan@all-MS-7D35:~/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.









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_id	employee
6461afb2113efd0007bcc507	{ "name": "sonoo", "salary": 56000, "married": true }

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_id	employee
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