

Docker Multi container Project → Mern Application with MongoDB

Mern → mongodb, mango express, Redis and nginx application

Prerequisite: install docker engine on ubuntu machine

By default, I don't have any images, containers ,volumes and I have default networks

```
root@VM01: /home/azadmin
root@VM01:/home/azadmin# docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
root@VM01:/home/azadmin# docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
root@VM01:/home/azadmin# docker network ls
NETWORK ID     NAME      DRIVER    SCOPE
25c78bfa3cde   bridge   bridge    local
9f62f627b0dc   host     host       local
a949eee950b7   none     null       local
root@VM01:/home/azadmin# docker volume ls
DRIVER    VOLUME NAME
root@VM01:/home/azadmin#
```

Step1: git clone https://github.com/kuchalakanti/mern_docker_demo.git

Create docker directory

mkdir docker

cd docker

```
root@VM01: /home/azadmin/docker
root@VM01:/home/azadmin/docker# git clone https://github.com/kuchalakanti/mern_docker_demo.git
Cloning into 'mern_docker_demo'...
remote: Enumerating objects: 33540, done.
remote: Counting objects: 100% (10/10), done.
remote: Compressing objects: 100% (9/9), done.
remote: Total 33540 (delta 3), reused 3 (delta 0), pack-reused 33530
Receiving objects: 100% (33540/33540), 48.23 MiB | 23.85 MiB/s, done.
Resolving deltas: 100% (6347/6347), done.
Updating files: 100% (47645/47645), done.
root@VM01:/home/azadmin/docker# ls
mern_docker_demo
root@VM01:/home/azadmin/docker#
```

```

root@VM01:/home/azadmin/docker# ls
mern_docker_demo
root@VM01:/home/azadmin/docker# cd mern_docker_demo/
root@VM01:/home/azadmin/docker/mern_docker_demo# ls
LICENSE  README.md  client  docker-compose.yml  nginx  server  testfork.txt
root@VM01:/home/azadmin/docker/mern_docker_demo# █

```

To build this application, I need Images, Networks and volumes

Let us create Network using below command

docker network create library-mern-api

```

root@VM01:/home/azadmin/docker/mern_docker_demo# docker network create library-mern-api
4a142dadfe6e916fbc0e2b9c8d7fec7e2c982dd7f92f9d152d386cc0815339a7
root@VM01:/home/azadmin/docker/mern_docker_demo# docker network ls
NETWORK ID          NAME                DRIVER              SCOPE
25c78bfa3cde        bridge              bridge              local
9f62f627b0dc        host                host                local
4a142dadfe6e        library-mern-api    bridge              local
a949eee950b7        none                null                local
root@VM01:/home/azadmin/docker/mern_docker_demo# █

```

Create Volume

docker volume create mongodb-data

```

root@VM01:/home/azadmin/docker/mern_docker_demo# docker volume create mongodb-data
mongodb-data

```

```

root@VM01:/home/azadmin/docker/mern_docker_demo# docker volume ls
DRIVER      VOLUME NAME
local       mongodb-data
root@VM01:/home/azadmin/docker/mern_docker_demo# █

```

For our application I need 5 images

Let us download mongo db and mongo express, we can get from hub.docker.com and remaining we can create images using Dockerfile

create container with new network with image mongo

```

docker run -dit -p 27017:27017 -e MONGO_INITDB_ROOT_USERNAME=admin -e
MONGO_INITDB_ROOT_PASSWORD=password -e PWD=/ -v mongodb-data:/data/db --name
mern_library_nginx_mongodb_1 --net library-mern-api mongo

```

-e → environment variable

-v → mounting volumes

Now I have MongoDB image and container

```
root@VM01: /home/azadmin/docker/mern_docker_demo# docker run -dit -p 27017:27017 -e MONGO_INITDB_ROOT_USERNAME=admin -e MONGO_INITDB_ROOT_PASSWORD=password -e PWD=/ -v mongodb-data:/data/db --name mern_library_nginx_mongodb_1 --net library-mern-api mongo
Unable to find image 'mongo:latest' locally
latest: Pulling from library/mongo
7646c8da3324: Pull complete
11f24d004130: Pull complete
1dfef8821fc6: Pull complete
bd2b135d9110: Pull complete
76154bf34598: Pull complete
a93134489020: Pull complete
fd1fa78ffcfb: Pull complete
d91b3273507c: Pull complete
Digest: sha256:bd38dc3d2895c7434b9b75c86525642efe3d65e4c6aadfe397486d7cc89406f0
Status: Downloaded newer image for mongo:latest
d5adbb142d77c79f372ee15d388c32d19dd6d8c8abc5dc502b8c1cf6fcb2def2
root@VM01: /home/azadmin/docker/mern_docker_demo# docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS
d5adbb142d77   mongo         "docker-entrypoint.s..." 15 seconds ago Up 13 seconds 0.0.0.0:27017->27017/tcp, :::27017->27017/tcp
root@VM01: /home/azadmin/docker/mern_docker_demo#
```

```
root@VM01: /home/azadmin/docker/mern_docker_demo# docker images
REPOSITORY    TAG          IMAGE ID          CREATED          SIZE
mongo         latest      95b3ba6bed35     4 weeks ago     797MB
root@VM01: /home/azadmin/docker/mern_docker_demo#
```

Now letus create mongo express [it is GUI to connect Mangodb]

```
docker run -dit -p 8081:8081 -e ME_CONFIG_MONGODB_ADMINUSERNAME=admin -e ME_CONFIG_MONGODB_ADMINPASSWORD=password --net library-mern-api --name mern_library_nginx_mongo-express_1 -e ME_CONFIG_MONGODB_SERVER=mern_library_nginx_mongodb_1 -e ME_CONFIG_BASICAUTH_USERNAME=admin -e ME_CONFIG_BASICAUTH_PASSWORD=admin123456 mongo-express
```

```
root@VM01: /home/azadmin/docker/mern_docker_demo# docker run -dit -p 8081:8081 -e ME_CONFIG_MONGODB_ADMINUSERNAME=admin -e ME_CONFIG_MONGODB_ADMINPASSWORD=password --net library-mern-api --name mern_library_nginx_mongo-express_1 -e ME_CONFIG_MONGODB_SERVER=mern_library_nginx_mongodb_1 -e ME_CONFIG_BASICAUTH_USERNAME=admin -e ME_CONFIG_BASICAUTH_PASSWORD=admin123456 mongo-express
Unable to find image 'mongo-express:latest' locally
latest: Pulling from library/mongo-express
619be1103602: Pull complete
7e9a007eb24b: Pull complete
5189255e31c8: Pull complete
88f4f8a6bc8d: Pull complete
d8305ae32c95: Pull complete
45b24ec126f9: Pull complete
9f7f59574f7d: Pull complete
0bf3571b6cd7: Pull complete
Digest: sha256:1b23d7976f0210dbec74045c209e52fbb26d29b2e873d6c6fa3d3f0ae32c2a64
Status: Downloaded newer image for mongo-express:latest
85809b692e00762c578d0272d4751f21957d967f369bd18f9c8e437f2e91607b
root@VM01: /home/azadmin/docker/mern_docker_demo#
```



```
root@VM01:/home/azadmin/docker/mern_docker_demo# docker ps
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS
85809b692e00   mongo-express                      "/sbin/tini -- /dock..." 4 seconds ago  Up 3 seconds  0.0.0.0:8081->8081/tcp, :::
8081->8081/tcp   mern_library_nginx_mongo-express_1
d5adbb142d77   mongo                             "docker-entrypoint.s..." 2 minutes ago  Up 2 minutes  0.0.0.0:27017->27017/tcp, :
::27017->27017/tcp mern_library_nginx_mongodb_1
root@VM01:/home/azadmin/docker/mern_docker_demo#
```

Now I will access mongoexpress

Use dockerhostip with port 8081



Give creds

Username: admin

Pwd: admin123456



Now navigate to Server folder

cd server

```
root@VM01:/home/azadmin/docker/mern_docker_demo/server
root@VM01:/home/azadmin/docker/mern_docker_demo# ls
LICENSE  README.md  client  docker-compose.yml  nginx  server  testfork.txt
root@VM01:/home/azadmin/docker/mern_docker_demo# cd server/
root@VM01:/home/azadmin/docker/mern_docker_demo/server# ls
Dockerfile      Makefile      database      models      package-lock.json  routes      utils
Dockerfile.prod  controllers  middleware    node_modules  package.json      server.js    yarn.lock
root@VM01:/home/azadmin/docker/mern_docker_demo/server#
```

You can see you have docker file in “Server” folder, now you have to build the image

```
# docker build -t mern_library_nginx_library_api .
```

```
root@VM01: /home/azadmin/docker/mern_docker_demo/server
root@VM01:/home/azadmin/docker/mern_docker_demo/server# docker images
REPOSITORY                                TAG                IMAGE ID           CREATED            SIZE
mern_library_nginx_library_api ✓         latest            231b4d01998e      25 seconds ago    187MB
mongo                                     latest            95b3ba6bed35      4 weeks ago       797MB
mongo-express                            latest            870141b735e7      3 months ago      182MB
node                                     14-alpine3.10     da9f219c3e03      3 years ago       117MB
root@VM01:/home/azadmin/docker/mern_docker_demo/server#
```

Now come out from server folder and navigate to client folder

```
root@VM01:/home/azadmin/docker/mern_docker_demo/server# cd ..
root@VM01:/home/azadmin/docker/mern_docker_demo# cd client/
root@VM01:/home/azadmin/docker/mern_docker_demo/client#
```

Build image from client folder

```
# docker build -t mern_library_nginx_client .
```

```
root@VM01:/home/azadmin/docker/mern_docker_demo/client# docker build -t mern_library_nginx_client .
```

```
# docker images
```

```
root@VM01:/home/azadmin/docker/mern_docker_demo/client# docker images
REPOSITORY                                TAG                IMAGE ID           CREATED            SIZE
mern_library_nginx_client ✓               latest            d101b1f800f0      5 seconds ago     711MB
mern_library_nginx_library_api             latest            231b4d01998e      6 minutes ago     187MB
mongo                                     latest            95b3ba6bed35      4 weeks ago       797MB
mongo-express                            latest            870141b735e7      3 months ago      182MB
node                                     14-alpine3.10     da9f219c3e03      3 years ago       117MB
root@VM01:/home/azadmin/docker/mern_docker_demo/client#
```

Now come out from client folder and navigate to “nginx” folder and build

```
# docker build -t mern_library_nginx_nginx .
```

```
root@VM01: /home/azadmin/docker/mern_docker_demo/nginx
root@VM01:/home/azadmin/docker/mern_docker_demo/nginx# docker build -t mern_library_nginx_nginx .
DEPRECATED: The legacy builder is deprecated and will be removed in a future release.
             Install the buildx component to build images with BuildKit:
             https://docs.docker.com/go/buildx/
```

```
# docker images
```

```
root@VM01:/home/azadmin/docker/mern_docker_demo/nginx# docker images
REPOSITORY                                TAG                IMAGE ID           CREATED            SIZE
mern_library_nginx_nginx ✓                latest            28c60ad469c4      24 seconds ago    22.6MB
mern_library_nginx_client                 latest            d101b1f800f0      2 minutes ago     711MB
mern_library_nginx_library_api             latest            231b4d01998e      9 minutes ago     187MB
mongo                                     latest            95b3ba6bed35      4 weeks ago       797MB
mongo-express                            latest            870141b735e7      3 months ago      182MB
node                                     14-alpine3.10     da9f219c3e03      3 years ago       117MB
nginx                                     1.19-alpine       a64a6e03b055      3 years ago       22.6MB
root@VM01:/home/azadmin/docker/mern_docker_demo/nginx#
```

Let’s create container using these images

Now navigate to Server folder and create container

```
docker run -dit -p 5000:5000 -e
MONGO_URI=mongodb://admin:password@mern_library_nginx_mongodb_1 -e
NODE_ENV=development -e PWD=/app -v "$(pwd)"/:app -v
"$(pwd)"/node_modules:/app/node_modules --net library-mern-api --name library_mern_nginx
mern_library_nginx_library_api
```

```
root@VM01:/home/azadmin/docker/mern_docker_demo/server# docker run -dit -p 5000:5000 -e MONGO_URI=mongodb://admin:password@mern_library_nginx_mongodb_1 -e NODE_ENV=development -e PWD=/app -v "$(pwd)"/:app -v "$(pwd)"/node_modules:/app/node_modules --net library-mern-api --name library_mern_nginx_library_api
cd029e8164caaae5f17c17e3e6f5f2a9e50874321b9b42b88eca8b17a7e2b605
root@VM01:/home/azadmin/docker/mern_docker_demo/server# docker ps
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS
cd029e8164ca	mern_library_nginx_library_api	"docker-entrypoint.s..."	7 seconds ago	Up 5 seconds	0.0.0.0:5000->5000/tcp, :::5000->5000/tcp
85809b692e00	mongo-express	"/sbin/tini -- /dock..."	20 minutes ago	Up 20 minutes	0.0.0.0:8081->8081/tcp, :::8081->8081/tcp
d5adbb142d77	mongo	"docker-entrypoint.s..."	22 minutes ago	Up 22 minutes	0.0.0.0:27017->27017/tcp, :::27017->27017/tcp

```
root@VM01:/home/azadmin/docker/mern_docker_demo/server#
```

Let me go to Client folder and create container

```
root@VM01:/home/azadmin/docker/mern_docker_demo/client
```

```
root@VM01:/home/azadmin/docker/mern_docker_demo/server# cd ..
root@VM01:/home/azadmin/docker/mern_docker_demo# cd client/
root@VM01:/home/azadmin/docker/mern_docker_demo/client#
```

```
docker run -d -v "$(pwd)"/:app -v "$(pwd)"/node_modules:/app/node_modules --net library-mern-api
--name library_mern_frontend mern_library_nginx_client
```

```
root@VM01:/home/azadmin/docker/mern_docker_demo/client# docker run -d -v "$(pwd)"/:app -v "$(pwd)"/node_modules:/app/node_modules --net library-mern-api --name library_mern_frontend mern_library_nginx_client
53e3f27b1c4dd325638bdd95c322ead633efd80e7e0dffbfd0570ef6e1877403
root@VM01:/home/azadmin/docker/mern_docker_demo/client# docker ps
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS
53e3f27b1c4d	mern_library_nginx_client	"docker-entrypoint.s..."	4 seconds ago	Up 3 seconds	
cd029e8164ca	mern_library_nginx_library_api	"docker-entrypoint.s..."	About a minute ago	Up About a minute	0.0.0.0:5000->5000/tcp, :::5000->5000/tcp
85809b692e00	mongo-express	"/sbin/tini -- /dock..."	22 minutes ago	Up 22 minutes	0.0.0.0:8081->8081/tcp, :::8081->8081/tcp
d5adbb142d77	mongo	"docker-entrypoint.s..."	24 minutes ago	Up 24 minutes	0.0.0.0:27017->27017/tcp, :::27017->27017/tcp

```
root@VM01:/home/azadmin/docker/mern_docker_demo/client#
```

Now create last container, and this can execute from anywhere

docker run -d -p 8080:80 --name mern_library_nginx_nginx_1 --net library-mern-api
mern_library_nginx_nginx

```
root@VM01: /home/azadmin/docker/mern_docker_demo/client
root@VM01: /home/azadmin/docker/mern_docker_demo/client# docker run -d -p 8080:80 --name mern_library_nginx_nginx_1 mern_library_nginx_nginx
39656ef5baf422f94e6dba7ab9bf6e1cc0a6fde179bac9ae5cb1f11d628e966d
```

```
root@VM01: /home/azadmin/docker/mern_docker_demo/client# docker ps
CONTAINER ID   IMAGE                                NAMES                                COMMAND                                CREATED
39656ef5baf4   mern_library_nginx_nginx            mern_library_nginx_nginx_1          "/docker-entrypoint..."            4 seconds ago
53e3f27b1c4d   mern_library_nginx_client           library_mern_frontend               "docker-entrypoint.s..."           About a minute ago
cd029e8164ca   mern_library_nginx_library_api      library_mern_nginx                  "docker-entrypoint.s..."           3 minutes ago
85809b692e00   mongo-express                       mern_library_nginx_mongo-express_1  "/sbin/tini -- /dock..."           23 minutes ago
d5adbb142d77   mongo                               "docker-entrypoint.s..."           25 minutes ago
, :::27017->27017/tcp  mern_library_nginx_mongodb_1
```

Now let us access the application from browser
Browse with dockerhostPIP:8080



