# Create a Docker Image and Deploy It on a Swarm Cluster

Course-end Project 1

Description

## Project objective:

You are working as a DevOps engineer in an IT firm. You have been asked to create a Redis-based Docker image and deploy it on a Swarm cluster.

## Background of the problem statement:

Your organization wants to use Redis in a Swarm cluster for the data storage and caching purpose. The development team has asked you to create a Redis-based Docker image using a Dockerfile and deploy this image on a Swarm cluster.

You have also been asked to publish this image on your organization's Docker Hub account so that other team members can also access this image.

## You must use the following:

- Docker CLI: To create the Docker image and deploy it on Swarm cluster
- Docker Hub: To publish the image

### Following requirements should be met:

- Follow the above-mentioned specifications
- Make sure you create an account on Docker Hub to push the Docker image
- Document the step-by-step process involved in completing this task

# Steps required to follow in the project.

- Write a docker file for redis-server
- On Master build docker image using docker build
- Create docker hub account
- Docker push on docker hub account
- Initialize the swarm cluster.
- Join nodes from Master to node
- Create a service based on docker image using redis-server build at #2

## Step 1 Write a docker file for redis-server

Create project directory and CD into it

```
mkdir /root/project
cd /root/project
```

create dockerfile: `/root/project/Dockerfile`

```
root@master:~/project# cat /root/project/Dockerfile
# /root/project/Dockerfile
FROM ubuntu
RUN apt update
RUN apt install -y lsb-release curl gpg
RUN curl -fsSL https://packages.redis.io/gpg | gpg --dearmor -o
/usr/share/keyrings/redis-archive-keyring.gpg
RUN echo "deb [signed-by=/usr/share/keyrings/redis-archive-keyring.gpg]
https://packages.redis.io/deb $(lsb_release -cs) main" | tee
/etc/apt/sources.list.d/redis.list
RUN apt-get update && apt-get -y install redis-server
CMD redis-server
EXPOSE 6379
```

```
root@master:~/project# cat /root/project/Dockerfile
# /root/project/Dockerfile
FROM ubuntu
RUN apt update
RUN apt install -y lsb-release curl gpg
RUN curl -fsSL https://packages.redis.io/gpg | gpg --dearmor -o /usr/share/keyrings/redis-archive-keyring.gpg
RUN echo "deb [signed-by=/usr/share/keyrings/redis-archive-keyring.gpg] https://packages.redis.io/deb $(lsb_release -cs) main" | tee /etc/apt/sources.list.d/redis.list
RUN apt-get update && apt-get -y install redis-server
CMD redis-server
EXPOSE 6379
root@master:~/project#
```

## Step 2 On Master build docker image using docker build

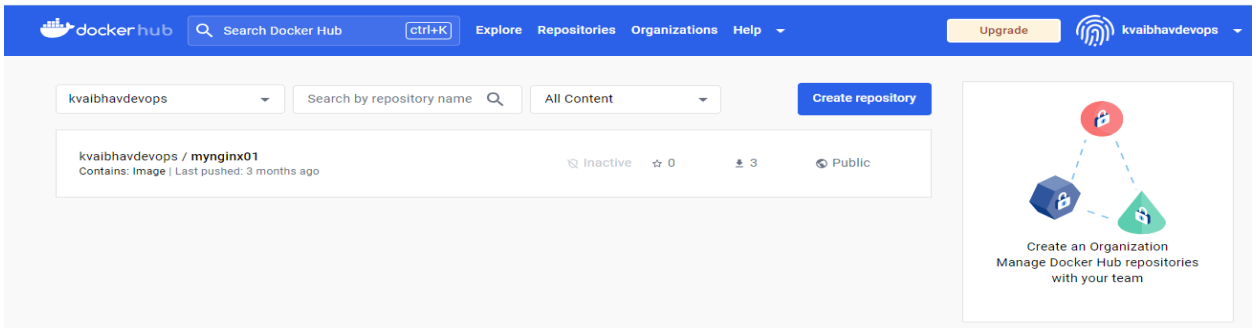
```
docker build /root/project/ -t redis-simplilearn:1.0
```

Out put of the above build

```
root@master:~/project# docker images
REPOSITORY                                TAG       IMAGE ID       CREATED
SIZE
redis-simplilearn                         1.0       49410959c973   22
seconds ago   177MB
```

```
root@master:~/project# docker images
REPOSITORY                                TAG       IMAGE ID       CREATED          SIZE
redis-simplilearn                         1.0       49410959c973   22 seconds ago   177MB
mywebapp                                  latest    0fe7b247b665   12 days ago      179MB
nginx                                     <none>    c20060033e06   4 weeks ago      187MB
```

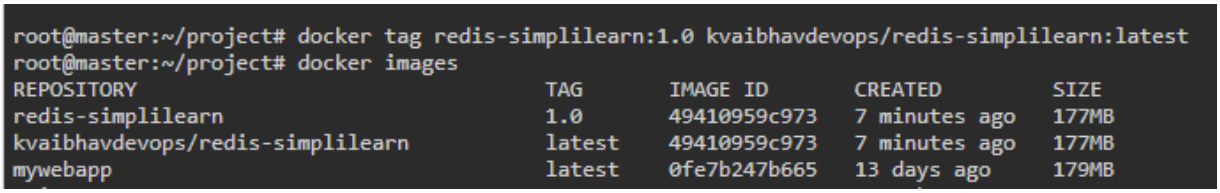
## Step 3  Create docker hub account



## Step 4 Docker push on docker hub account

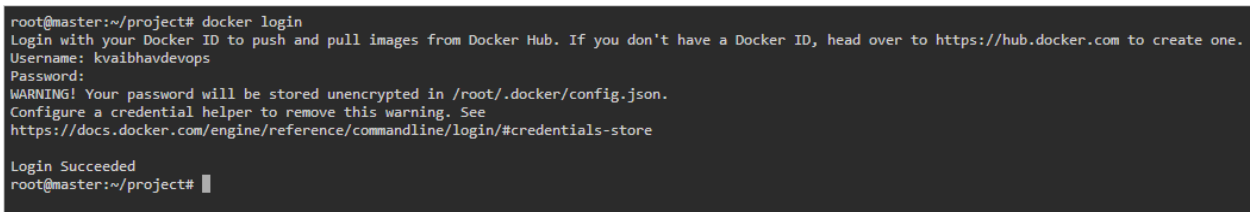
### Tag the image with your account name

```
docker tag redis-simplilearn:1.0 kvaibhavdevops/redis-simplilearn:latest
```




```
root@master:~/project# docker tag redis-simplilearn:1.0
kvaibhavdevops/redis-simplilearn:latest
root@master:~/project# docker images
REPOSITORY                                  TAG       IMAGE ID       CREATED
SIZE
redis-simplilearn                           1.0       49410959c973   7
minutes ago   177MB
kvaibhavdevops/redis-simplilearn            latest    49410959c973   7
minutes ago   177MB
mywebapp                                    latest    0fe7b247b665   13 days
ago     179MB
```

### Login to dockerhub




```
root@master:~/project# docker login
Login with your Docker ID to push and pull images from Docker Hub. If you
don't have a Docker ID, head over to https://hub.docker.com to create one.
Username: kvaibhavdevops
Password:
WARNING! Your password will be stored unencrypted in
/root/.docker/config.json.
Configure a credential helper to remove this warning. See
```

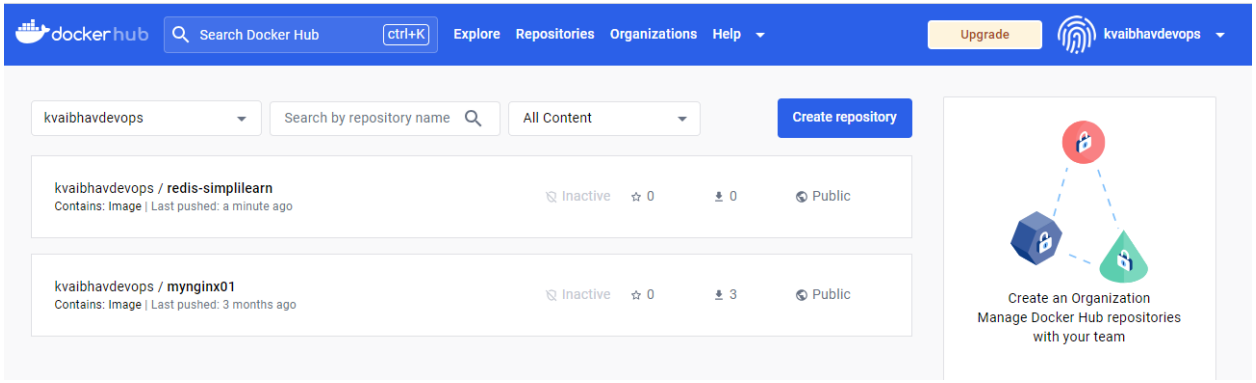
```
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
```

## Push the image on docker hub

```
docker push kvaibhavdevops/redis-simplilearn:latest
```

```
root@master:~/project# docker push kvaibhavdevops/redis-simplilearn:latest
The push refers to repository [docker.io/kvaibhavdevops/redis-simplilearn]
2cedb1d0e0c3: Pushed
06d94216f377: Pushed
84ae910ba5de: Pushed
4352741f0a67: Pushed
4cc5cfeaa61c: Pushed
256d88da4185: Mounted from library/ubuntu
latest: digest:
sha256:13d79e56f6f84c0386e92c9e13becb2d9b4597c3dd46bd73443f48147924a323
size: 1580
```




## Step 5 Initialize the swarm cluster.

```
root@master:~/project# docker swarm init
Swarm initialized: current node (tfi8n5a1v1ige37j0wvr8r38t) is now a
manager.
To add a worker to this swarm, run the following command:
```

```
    docker swarm join --token
SWMTKN-1-0mp2lyw7x07m48rmhy8ajy8cdcqpr86bq01nz9e88obwrj1b83-akfktl1vbdy6kga
c2l2ka8qfw 172.31.28.154:2377

To add a manager to this swarm, run 'docker swarm join-token manager' and
follow the instructions.
```

```
root@master:~/project# docker swarm init
Swarm initialized: current node (tfi8n5a1v1ige37j0wvr8r38t) is now a manager.

To add a worker to this swarm, run the following command:

    docker swarm join --token SWMTKN-1-0mp2lyw7x07m48rmhy8ajy8cdcqpr86bq01nz9e88obwrj1b83-akfktl1vbdy6kgac2l2ka8qfw 172.31.28.154:2377

To add a manager to this swarm, run 'docker swarm join-token manager' and follow the instructions.

root@master:~/project#
```

## Step 6 Join nodes from Master to node

```
root@master:~/project# docker node ls
ID                            HOSTNAME           STATUS    AVAILABILITY   MANAGER STATUS   ENGINE
VERSION
tfi8n5a1v1ige37j0wvr8r38t *   ip-172-31-28-154   Ready     Active         Leader           20.10.13
ptu0m11h2fjr6l2jz4klu62x8     ip-172-31-32-168   Ready     Active                          20.10.13
624pzsrnq0x24mx1cpljrms95     ip-172-31-39-45    Ready     Active                          20.10.13
root@master:~/project#
```

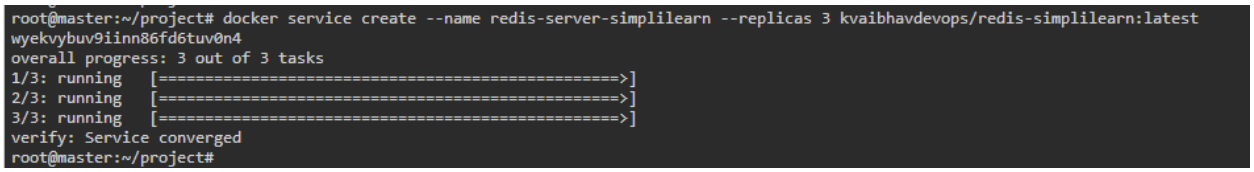
```
root@master:~/project# docker node ls
ID                            HOSTNAME           STATUS    AVAILABILITY   MANAGER STATUS   ENGINE VERSION
tfi8n5a1v1ige37j0wvr8r38t *   ip-172-31-28-154   Ready     Active         Leader           20.10.13
ptu0m11h2fjr6l2jz4klu62x8     ip-172-31-32-168   Ready     Active                          20.10.13
624pzsrnq0x24mx1cpljrms95     ip-172-31-39-45    Ready     Active                          20.10.13
root@master:~/project#
```

## Step 7 Create a service based on docker image using redis-server build at #2

```
docker service create --name redis-server-simplilearn --replicas 3
kvaibhavdevops/redis-simplilearn:latest
```

Out put of the above command

```
root@master:~/project# docker service create --name redis-server-simplilearn
--replicas 3 kvaibhavdevops/redis-simplilearn:latest
wyekvybuv9iinn86fd6tuv0n4
overall progress: 3 out of 3 tasks
1/3: running   [==================================================>]
2/3: running   [==================================================>]
3/3: running   [==================================================>]
verify: Service converged
root@master:~/project#
```




## Verify and explore the service

```
root@master:~/project# docker service ls
ID             NAME                        MODE         REPLICAS   IMAGE
PORTS
wyekvybuv9ii   redis-server-simplilearn   replicated   3/3
kvaibhavdevops/redis-simplilearn:latest
root@master:~/project#
```

```
root@master:~/project# docker service ps redis-server-simplilearn
ID             NAME                         IMAGE                                        NODE
DESIRED STATE   CURRENT STATE           ERROR     PORTS
ffoqyh2hwq8j   redis-server-simplilearn.1   kvaibhavdevops/redis-simplilearn:latest   ip-172-31-28-154
Running         Running 2 minutes ago
u396u9fv79co   redis-server-simplilearn.2   kvaibhavdevops/redis-simplilearn:latest   ip-172-31-32-168
Running         Running 2 minutes ago
ytl29m7rxkyv   redis-server-simplilearn.3   kvaibhavdevops/redis-simplilearn:latest   ip-172-31-39-45
Running         Running 2 minutes ago
root@master:~/project#
```