

Docker Assignment-3

Multi-Node Docker Swarm Cluster for High Availability

Step 1: Initialize Docker Swarm, Check the cluster

Step 2: Create a Docker Compose File

```
master@master-vm:~$ docker swarm init --advertise-addr 192.168.219.137
Swarm initialized: current node (m5n7ln8k1lmsm69uo4mqvgzv) is now a manager.

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

    docker swarm join --token SWMTKN-1-1xz5s5jyweo4dinhrhwjffjulgxef83lx1277uyaa3ky3ejrnw3k-a9px9h85pid31d5957g7pmtj7 192.168.219.137:2377

To add a manager to this swarm, run 'docker swarm join-token manager' and follow the instructions.
master@master-vm:~$ docker node ls
ID                                HOSTNAME        STATUS        AVAILABILITY    MANAGER STATUS    ENGINE VERSION
m5n7ln8k1lmsm69uo4mqvgzv *      master-vm      Ready         Active           Leader             28.0.1
4zvd78y6a4rh2ne7n2ie13yhd      node1-vm      Ready         Active           -                  26.1.3
bnpia2fuitpkr5dkvu9au2y7       node2-vm      Ready         Active           -                  26.1.3
master@master-vm:~$ ls
composetest  Documents  Music      Public      Videos
Desktop      Downloads  nginx_project snap
doc_swarm    Flask-Docker  Pictures  Templates
master@master-vm:~$ ls
composetest  Documents  Music      Public      Videos
Desktop      Downloads  nginx_project snap
doc_swarm    Flask-Docker  Pictures  Templates
master@master-vm:~$ mkdir doc_swarm
mkdir: cannot create directory 'doc_swarm': File exists
master@master-vm:~$ rm -R doc_swarm
master@master-vm:~$ mkdir doc_swarm
master@master-vm:~$ cd doc_swarm
master@master-vm:~/doc_swarm$ ls
master@master-vm:~/doc_swarm$ nano docker_compose.yml
```

Docker_compose.yml file

```
GNU nano 6.2 docker_compose.yml
nginx:
  image: nginx:latest
  ports:
    - "80:80"
  deploy:
    replicas: 3
    restart_policy:
      condition: on-failure
  networks:
    - my_network

redis:
  image: redis:alpine
  deploy:
    replicas: 2
    restart_policy:
      condition: on-failure
  networks:
    - my_network

postgres:
  image: postgres:13
  environment:
    POSTGRES_USER: admin
    POSTGRES_PASSWORD: password
  volumes:
    - postgres_data:/var/lib/postgresql/data
  networks:
    - my_network

networks:
  my_network:

volumes:
  postgres_data:
```

Step 3: Deploy the Application on Swarm

```
master@master-vm:~/doc_swarm$ docker stack deploy -c docker_compose.yml myapp
Since --detach=false was not specified, tasks will be created in the background.
In a future release, --detach=false will become the default.
Creating network myapp_my_network
Creating service myapp_nginx
Creating service myapp_redis
Creating service myapp_postgres
```

Check service status

```
master@master-vm: ~/doc_swarm$ docker service ls
ID            NAME          MODE          REPLICAS  IMAGE          PORTS
7gypkw9nnerz  myapp_nginx   replicated    3/3        nginx:latest   *:80->80/tcp
w5o1s8vl2sv6  myapp_postgres replicated    1/1        postgres:13
ty44n2tznstx  myapp_redis   replicated    2/2        redis:alpine
```

Copy the join token and add worker node-1

```
node1@node1-vm: $ sudo docker swarm join --token SWMTKN-1-1xz5sjyweo4dinhrhwjffjulgxef83lx1277uyaa3ky3ejrnw3k-a9px9h85pid31d5957g7pmt
j7 192.168.219.137:2377
[sudo] password for node1:
This node joined a swarm as a worker.
```

```
node1@node1-vm: $ sudo docker ps
[sudo] password for node1:
CONTAINER ID        IMAGE               COMMAND                  CREATED            STATUS             PORTS               NAMES
afd81f975b89       redis:alpine        "docker-entrypoint.s..." 23 minutes ago    Up 23 minutes     6379/tcp            myapp_redis.1.ry6l81yk5f4fcjrcm0j
z83tr7
2381316e1a65       nginx:latest        "/docker-entrypoint..." 23 minutes ago    Up 23 minutes     80/tcp              myapp_nginx.3.psazunoq57tt20ligw4
r91ols
node1@node1-vm: $
```

Copy the join token and add worker node-2

```
node2@node2-vm: $ sudo docker swarm join --token SWMTKN-1-1xz5sjyweo4dinhrhwjffjulgxef83lx1277uyaa3ky3ejrnw3k-a9px9h85pid31d5957g7pmt
j7 192.168.219.137:2377
[sudo] password for node2:
This node joined a swarm as a worker.
```

Pulled the postgres

```
node2@node2-vm: ~
Using default tag: latest
latest: Pulling from library/postgres
7cf63256a31a: Already exists
543c6dea2e39: Pull complete
dc87fb4dbc03: Pull complete
55c54708c8e7: Pull complete
878a40f56a67: Pull complete
6424ae1ae883: Pull complete
600e770d797e: Pull complete
a21a08dbca2c: Pull complete
783086ffbe8e: Pull complete
42e76ffa3e07: Pull complete
fccccaf45a4d: Pull complete
420a047e4570: Pull complete
553d1749e29f: Pull complete
bc13f9b1d80d: Pull complete
Digest: sha256:81f32a88ec561664634637dd446487efd5f9d0996304b96210078e90e5c8b21
Status: Downloaded newer image for postgres:latest
docker.io/library/postgres:latest

node2@node2-vm: $ sudo docker ps
CONTAINER ID        IMAGE               COMMAND                  CREATED            STATUS             PORTS               NAMES
a0b6869a0070       postgres           "docker-entrypoint.s..." 2 minutes ago     Up 2 minutes      5432/tcp            myapp_postgres
abc8deabd5b6       nginx:latest       "/docker-entrypoint..." 35 minutes ago    Up 35 minutes     80/tcp              myapp_nginx.2.tqo5dsqpp2dlyxwjftb
qm8f5l
node2@node2-vm: $
```

See the list of services running in multiple nodes

```
master@master-vm: ~/doc_swarm$ docker service ls
ID            NAME          MODE          REPLICAS  IMAGE          PORTS
nn7xpxyb8rgw  myapp_nginx   replicated    3/3        nginx:latest   *:80->80/tcp
rkt9pvcfbidl  myapp_postgres replicated    1/1        postgres:13
av3u41rki2cr  myapp_redis   replicated    2/2        redis:alpine

master@master-vm: ~/doc_swarm$ docker ps
CONTAINER ID        IMAGE               COMMAND                  CREATED            STATUS             PORTS               NAMES
7485fe527d18       postgres:13        "docker-entrypoint.s..." 40 minutes ago    Up 40 minutes     5432/tcp            myapp_postgres.1.ddtbn4y0kfwk8wg99gdneyy5e
70a5731a45a1       nginx:latest       "/docker-entrypoint..." About an hour ago  Up About an hour   80/tcp              myapp_nginx.1.iq1mzvklr9x91ivgmaelsfga
da9ce80a8edf       nginx:latest       "/docker-entrypoint..." About an hour ago  Up About an hour   80/tcp              myapp_nginx.2.ifsapkcwjjfvvay32lo473g6z
1121a3d2e893       redis:alpine       "docker-entrypoint.s..." About an hour ago  Up About an hour   6379/tcp            myapp_redis.1.kktwkrpd5nquf40wc4pgy39i
633392d0dc97       nginx:latest       "/docker-entrypoint..." About an hour ago  Up About an hour   80/tcp              myapp_nginx.3.z3b3duhh6on2swm69zlo2ev67
09ca4a984d31       portainer/portainer-ce "/portainer"          5 days ago        Up 3 hours         8000/tcp, 9443/tcp, 0.0.0.0:
9000->9000/tcp, [::]:9000->9000/tcp portainer
```