

Multi-Node Docker Swarm Cluster For High Availability

```
master@master-vm: ~/Desktop$ ls
nginx_project
master@master-vm:~/Desktop$ ll
total 12
drwxr-xr-x 3 master master 4096 Mar  5 10:20 ./
drwxr-xr-x 14 master master 4096 Feb 24 17:53 ../
drwxrwxr-x 2 master docker 4096 Mar  5 10:22 nginx_project/
master@master-vm:~/Desktop$ docker --version
Docker version 28.0.1, build 068a01e
master@master-vm:~/Desktop$ jenkins --version
jenkins: command not found
master@master-vm:~/Desktop$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 00:0c:29:6b:bd:a7 brd ff:ff:ff:ff:ff:ff
    altname enp2s1
    inet 192.168.219.137/24 brd 192.168.219.255 scope global dynamic noprefixroute ens33
        valid_lft 1199sec preferred_lft 1199sec
    inet6 fe80::ee42:5501:2c3a:bc42/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
3: docker0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 3a:39:1f:a0:8e:ff brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
        valid_lft forever preferred_lft forever
    inet6 fe80::3839:1fff:fea0:8eff/64 scope link
        valid_lft forever preferred_lft forever
4: vetha8094ad@if2: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue master docker0 state UP group default
    link/ether 5e:34:14:01:46:99 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet6 fe80::5c34:14ff:fe01:4699/64 scope link
        valid_lft forever preferred_lft forever
```

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inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
    valid_lft forever preferred_lft forever
    inet6 fe80::3839:1fff:fea0:8eff/64 scope link
        valid_lft forever preferred_lft forever
4: vetha8094ad@if2: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue master docker0 state UP group default
    link/ether 5e:34:14:01:46:99 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet6 fe80::5c34:14ff:fe01:4699/64 scope link
        valid_lft forever preferred_lft forever
master@master-vm:~/Desktop$ ip -a
Usage: ip [ OPTIONS ] OBJECT { COMMAND | help }
ip [ -force ] -batch filename
where OBJECT := { address | addrlabel | fou | help | ila | ioam | l2tp | link |
                  macsec | maddress | monitor | mptcp | mroute | mrule |
                  neighbor | neighbour | netconf | netns | nexthop | ntable |
                  ntbl | route | rule | sr | tap | tcpmetrics |
                  token | tunnel | tuntap | vrf | xfrm }
OPTIONS := { -V[ersion] | -s[tatistics] | -d[etails] | -r[esolve] |
             -h[uman-readable] | -lec | -j[son] | -p[retty] |
             -f[amily] { inet | inet6 | mpls | bridge | link } |
             -4 | -6 | -M | -B | -0 |
             -l[oops] { maximum-addr-flush-attempts } | -br[ief] |
             -o[neline] | -t[imestamp] | -ts[hort] | -b[atch] [filename] |
             -rc[vbuf] [size] | -n[etns] name | -N[umeric] | -a[ll] |
             -c[olor]}
master@master-vm:~/Desktop$ ipa
Command 'ipa' not found, but can be installed with:
sudo apt install freeipa-client
master@master-vm:~/Desktop$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
```

```
Activities Workstation master@master-vm: ~/Desktop

link/ether 5e:34:14:01:46:99 brd ff:ff:ff:ff:ff:ff link-netnsid 0
inet6 fe80::5c34:14ff:fe01:4699/64 scope link
valid_lft forever preferred_lft forever
master@master-vm:~/Desktop$ docker swarm init --advertise-addr 192.168.219.137
Swarm initialized: current node (ell7brebe3hmulsnmjsve133a) is now a manager.

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

    docker swarm join --token SWMTKN-1-51kleah9jkbna637gg1rwiapsie2eozb491jyx9nt9cus7t81f-31kSt54vcg4fygolmls3nhsko 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:~/Desktop$ docker swarm join --token SWMTKN-1-51kleah9jkbna637gg1rwiapsie2eozb491jyx9nt9cus7t81f-31kSt54vcg4fygolmls3nhsko 192.168.219.137:2377^C
master@master-vm:~/Desktop$ docker swarm init --advertise-addr 192.168.219.137^C
master@master-vm:~/Desktop$ ^C
master@master-vm:~/Desktop$ ls
nginx_project
master@master-vm:~/Desktop$ docker node ls
master@master-vm:~/Desktop$
ID                HOSTNAME        STATUS    AVAILABILITY    MANAGER STATUS    ENGINE VERSION
ell7brebe3hmulsnmjsve133a *   master-vm      Ready    Active           Leader             28.0.1
aih7kn5go0kteez7pptlwbx8x    node1-vm      Ready    Active           26.1.3
rbcoj6rmaq3k1pl2jftpe8g0y    node2-vm      Ready    Active           26.1.3
master@master-vm:~/Desktop$ sudo nano docker-compose.yml
[sudo] password for master:
master@master-vm:~/Desktop$ docker stack deploy -c docker-compose.yml myapp
docker: 'docker stack deploy' requires 1 argument

Usage: docker stack deploy [OPTIONS] STACK

Run 'docker stack deploy --help' for more information
master@master-vm:~/Desktop$ 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.
```

```
Activities Workstation master@master-vm: ~/Desktop

ID                NAME            MODE        REPLICAS    IMAGE          PORTS
5e40bc5f0ycw      myapp_nginx     replicated  1/3          nginx:latest   *:80->80/tcp
jq151a88kyhn      myapp_postgres  replicated  0/1          postgres:13
x0kzht3xqfiy      myapp_redis     replicated  0/2          redis:alpine

master@master-vm:~/Desktop$ 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.
Updating service myapp_nginx (id: 5e40bc5f0ycwhqu7d276o1mr2)
image nginx:latest could not be accessed on a registry to record
its digest. Each node will access nginx:latest independently,
possibly leading to different nodes running different
versions of the image.

Updating service myapp_redis (id: x0kzht3xqfiyh2aryylhjwu6x)
image redis:alpine could not be accessed on a registry to record
its digest. Each node will access redis:alpine independently,
possibly leading to different nodes running different
versions of the image.

Updating service myapp_postgres (id: jq151a88kyhnyogtx10hnp164)
image postgres:13 could not be accessed on a registry to record
its digest. Each node will access postgres:13 independently,
possibly leading to different nodes running different
versions of the image.

master@master-vm:~/Desktop$ docker service ls
ID                NAME            MODE        REPLICAS    IMAGE          PORTS
5e40bc5f0ycw      myapp_nginx     replicated  1/3          nginx:latest   *:80->80/tcp
jq151a88kyhn      myapp_postgres  replicated  0/1          postgres:13
x0kzht3xqfiy      myapp_redis     replicated  0/2          redis:alpine

master@master-vm:~/Desktop$ docker pull nginx
Using default tag: latest
latest: Pulling from library/nginx
Digest: sha256:9d6b58feebd2dbd3c56ab585333d627cc6e281011cfd6050fa4bcf2072c9496
Status: Image is up to date for nginx:latest
```

```
Activities Workstation master@master-vm: ~/Desktop

master@master-vm:~/Desktop$ docker service ls
ID NAME MODE REPLICAS IMAGE PORTS
5e40bc5f0ycw myapp_nginx replicated 1/3 nginx:latest *:80->80/tcp
jq151a88kyhn myapp_postgres replicated 0/1 postgres:13
x0kzht3xqfiy myapp_redis replicated 0/2 redis:alpine

master@master-vm:~/Desktop$ docker pull nginx
Using default tag: latest
latest: Pulling from library/nginx
Digest: sha256:9d6b58feebd2dbd3c56ab585333d627cc6e281011cfd6050fa4bcf2072c9496
Status: Image is up to date for nginx:latest
docker.io/library/nginx:latest

master@master-vm:~/Desktop$ docker pull redis:alpine
Error response from daemon: toomanyrequests: You have reached your unauthenticated pull rate limit. https://www.docker.com/increase-rate-limit

master@master-vm:~/Desktop$ docker service ls
ID NAME MODE REPLICAS IMAGE PORTS
5e40bc5f0ycw myapp_nginx replicated 3/3 nginx:latest *:80->80/tcp
jq151a88kyhn myapp_postgres replicated 0/1 postgres:13
x0kzht3xqfiy myapp_redis replicated 0/2 redis:alpine

master@master-vm:~/Desktop$ docker logout
Removing login credentials for https://index.docker.io/v1/
master@master-vm:~/Desktop$ docker login

USING WEB-BASED LOGIN

Info -> To sign in with credentials on the command line, use 'docker login -u <username>'

Your one-time device confirmation code is: PVNQ-GRVG
Press ENTER to open your browser or submit your device code here: https://login.docker.com/activate

Waiting for authentication in the browser...
^Clogin canceled
master@master-vm:~/Desktop$ docker login
```

```
Activities Workstation master@master-vm: ~/Desktop

https://docs.docker.com/go/credential-store/

Login Succeeded

master@master-vm:~/Desktop$ docker service ls
ID NAME MODE REPLICAS IMAGE PORTS
5e40bc5f0ycw myapp_nginx replicated 3/3 nginx:latest *:80->80/tcp
jq151a88kyhn myapp_postgres replicated 0/1 postgres:13
x0kzht3xqfiy myapp_redis replicated 0/2 redis:alpine

master@master-vm:~/Desktop$ docker pull postgres
Using default tag: latest
latest: Pulling from library/postgres
7cf63256a31a: Already exists
543c6dea2e39: Pull complete
dc87fb4dbc03: Pull complete
55c54708c8e7: Pull complete
078a40f56a67: Pull complete
6424ae1ae883: Pull complete
600e770d797e: Pull complete
a21a08dbca2c: Pull complete
783086ffbe8e: Pull complete
42e76ffa3e07: Waiting
fccc4fd45a4d: Download complete
420a047e4570: Download complete
553d1749e29f: Download complete
bc13f9b1d80d: Download complete

master@master-vm:~/Desktop$ docker service ls
ID NAME MODE REPLICAS IMAGE PORTS
5e40bc5f0ycw myapp_nginx replicated 3/3 nginx:latest *:80->80/tcp
jq151a88kyhn myapp_postgres replicated 0/1 postgres:13
x0kzht3xqfiy myapp_redis replicated 0/2 redis:alpine

master@master-vm:~/Desktop$ docker pull postgres
Using default tag: latest
latest: Pulling from library/postgres
7cf63256a31a: Already exists
543c6dea2e39: Pull complete
```



```

naster@master-vm: ~/Desktop$ docker service ls
ID                NAME                MODE                REPLICAS            IMAGE                PORTS
5e40bc5f0ycw      myapp_nginx         replicated          3/3                 nginx:latest        *:80->80/tcp
jq151a88kyhn      myapp_postgres       replicated          1/1                 postgres:13
x0kzht3xqfiy      myapp_redis         replicated          0/2                 redis:alpine

naster@master-vm: ~/Desktop$ docker service ls
ID                NAME                MODE                REPLICAS            IMAGE                PORTS
5e40bc5f0ycw      myapp_nginx         replicated          3/3                 nginx:latest        *:80->80/tcp
jq151a88kyhn      myapp_postgres       replicated          1/1                 postgres:13
x0kzht3xqfiy      myapp_redis         replicated          0/2                 redis:alpine

naster@master-vm: ~/Desktop$ docker pull redis:alpine
alpine: Pulling from library/redis
f18232174bc9: Pull complete
16cd0457255f: Pull complete
fa05f5234346: Pull complete
4d03bd351ab9: Pull complete
4738865c5f32: Pull complete
927ba88b2847: Pull complete
4f4fb700ef54: Pull complete
4c7f0522bc7d: Pull complete
Digest: sha256:02419de7eddf55aa5bcf49efb74e88fa8d931b4d77c0eff8a6b2144472b6952
Status: Downloaded newer image for redis:alpine
docker.io/library/redis:alpine
naster@master-vm: ~/Desktop$ docker service ls
ID                NAME                MODE                REPLICAS            IMAGE                PORTS
5e40bc5f0ycw      myapp_nginx         replicated          3/3                 nginx:latest        *:80->80/tcp
jq151a88kyhn      myapp_postgres       replicated          1/1                 postgres:13
x0kzht3xqfiy      myapp_redis         replicated          1/2                 redis:alpine

naster@master-vm: ~/Desktop$ docker service ls
ID                NAME                MODE                REPLICAS            IMAGE                PORTS
5e40bc5f0ycw      myapp_nginx         replicated          3/3                 nginx:latest        *:80->80/tcp
jq151a88kyhn      myapp_postgres       replicated          1/1                 postgres:13
x0kzht3xqfiy      myapp_redis         replicated          2/2                 redis:alpine

naster@master-vm: ~/Desktop$ docker pull nginx:latest
latest: Pulling from library/nginx
Digest: sha256:9d6b58feebd2dbd3c56ab585333d627cc6e281011cfd6050fa4bcf2072c9496
Status: Image is up to date for nginx:latest

```