



School of Computer Science Engineering and Application

BCA TY SEM VI

Subject Name: Container and Orchestration Practical

Assignment No 7

Aim:

Start Docker Swarm Services, Create A Service, Also Show the Working of Manager and Worker Node.

Submitted By

Name: Jayesh Bhangale

PRN: 20210801024

Date: (08/04/2024)

Technology Used: Docker, Container, AWS

Step 1: Create instance and then connect it to local terminal

- Sudo apt-get update -y
- Docker swarm init

The screenshot shows the AWS EC2 Instances page in a Safari browser. The main table displays four instances:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone
worker1	i-06543aa0320a58328	Running	t2.micro	2/2 checks passed	View alarms	ap-south-1a
ec2 swarm	i-011008db3c12f4211	Running	t2.micro	2/2 checks passed	View alarms	ap-south-1a
manager	i-0573903a63bba0a74	Running	t2.micro	2/2 checks passed	View alarms	ap-south-1a
worker2	i-07eae9a1970741bb4	Running	t2.micro	2/2 checks passed	View alarms	ap-south-1a

A modal window titled "Select an instance" is overlaid on the table, indicating that an instance is being selected for further action.

```

Running kernel seems to be up-to-date.
No services need to be restarted.
No containers need to be restarted.
No user sessions are running outdated binaries.
No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@ip-172-31-34-4:~# systemctl status docker
● docker.service - Docker Application Container Engine
    Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset: enabled)
      Active: active (running) since Sun 2024-04-07 17:18:21 UTC; 7s ago
        TriggeredBy: ● docker.socket
          Docs: https://docs.docker.com
        Main PID: 3178 (dockerd)
       Tasks: 8
         Memory: 103.7M
            CPU: 360ms
          CGroup: /system.slice/docker.service
                  └─3178 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

Apr 07 17:18:20 ip-172-31-34-4 systemd[1]: Starting Docker Application Container Engine...
Apr 07 17:18:20 ip-172-31-34-4 dockerd[3178]: time="2024-04-07T17:18:20.886714686Z" level=info msg="Starting up"
Apr 07 17:18:20 ip-172-31-34-4 dockerd[3178]: time="2024-04-07T17:18:20.898217812Z" level=info msg="Detected 127.0.0.53 nameserver, assuming systemd-resolved"
Apr 07 17:18:21 ip-172-31-34-4 dockerd[3178]: time="2024-04-07T17:18:21.102657553Z" level=info msg="Loading containers: start."
Apr 07 17:18:21 ip-172-31-34-4 dockerd[3178]: time="2024-04-07T17:18:21.456508790Z" level=info msg="Loading containers: done."
Apr 07 17:18:21 ip-172-31-34-4 dockerd[3178]: time="2024-04-07T17:18:21.498833382Z" level=info msg="Docker daemon" commit=5b79278 containerd-snapshotter=true
Apr 07 17:18:21 ip-172-31-34-4 dockerd[3178]: time="2024-04-07T17:18:21.499989311Z" level=info msg="Daemon has completed initialization"
Apr 07 17:18:21 ip-172-31-34-4 dockerd[3178]: time="2024-04-07T17:18:21.560033282Z" level=info msg="API listen on /run/docker.sock"
Apr 07 17:18:21 ip-172-31-34-4 systemd[1]: Started Docker Application Container Engine.
lines 1-21/21 (END)

i-011008db3c12f4211 (ec2 swarm)

PublicIPs: 65.2.171.54 PrivateIPs: 172.31.34.4

```

```

44 updates can be applied immediately.
28 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Last login: Sun Apr 7 16:47:07 2024 from 13.233.177.5
ubuntu@ip-172-31-38-196:~$ sudo -i
root@ip-172-31-38-196:~# docker join-token worker
docker: 'join-token' is not a docker command.
See 'docker --help'.
root@ip-172-31-38-196:~# docker swarm join-token worker
To add a worker to this swarm, run the following command:

  docker swarm join --token SWMTKN-1-2o4bwao5wxnxktimo80g2g08b8ippjkl8d131wt5ueg9qdpxc-ajt9v8j4ui8hw67uo0g1c78i 172.31.38.196:2377

root@ip-172-31-38-196:~# docker swarm init
Error response from daemon: This node is already part of a swarm. Use "docker swarm leave" to leave this swarm and join another one.
root@ip-172-31-38-196:~# docker swarm leave --force
Node left the swarm.
root@ip-172-31-38-196:~# docker swarm init
Swarm initialized: current node (x1wjqwiesxj4ayjrhs0r2yzcx) is now a manager.

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

  docker swarm join --token SWMTKN-1-6dfjusy645o29krgp2gzm8hz19odbkqt8p0dwkkhkmeuy6eu5xe-dlumy4we4xh9ih5vo1l7mrlij5 172.31.38.196:2377

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

root@ip-172-31-38-196:~#

```

i-0573903a63bba0a74 (manager)

PublicIPs: 13.201.122.122 PrivateIPs: 172.31.38.196

Step 2: Write commands to configure the instance and scale up the services and make a manager node also ping network

- Docker info
- Ping www.google.com -c4
- Docker service create alpine ping www.google.com
- Docker service ls
- Docker service ps ID
- Docker container ls
- Docker node ls

```

Safari File Edit View History Bookmarks Window Help
ap-south-1.console.aws.amazon.com/ec2-instance-connect/ssh?connType=star
Instances | EC2 | ap-south-1 EC2 Instance Connect | ap... Meet - ygr-fmjz-nap Mumbai | Jayesh Bhangle
Services Search [Option+S]
EC2
root@ip-172-31-38-196:~# docker service ps 2pxxxffaltm7
ID          NAME      IMAGE      NODE      DESIRED STATE     CURRENT STATE      ERROR      PORTS
g2intqtoexkz  blissful_colden.1  alpine:latest  ip-172-31-38-196  Running   Running 3 minutes ago
root@ip-172-31-38-196:~# docker service create alpine ping www.google.com
ii7gihbsyqjix5aqop9p2dit8
overall progress: 1 out of 1 tasks
1/1: running  [=====>]
verify: Service ii7gihbsyqjix5aqop9p2dit8 converged
root@ip-172-31-38-196:~# docker service ls
ID          NAME      MODE      REPLICAS  IMAGE      PORTS
2pxxxffaltm7  blissful_colden  replicated  1/1    alpine:latest
ii7gihbsyqjij nostalgic_wiles  replicated  1/1    alpine:latest
root@ip-172-31-38-196:~# docker service scale 2pxxxffaltm7=5
2pxxxffaltm7 scaled to 5
overall progress: 5 out of 5 tasks
1/5: running  [=====>]
2/5: running  [=====>]
3/5: running  [=====>]
4/5: running  [=====>]
5/5: running  [=====>]
verify: Service 2pxxxffaltm7 converged
root@ip-172-31-38-196:~# docker service ls -a
unknown shorthand flag: 'a' in -a
See 'docker service ls --help'.
root@ip-172-31-38-196:~# docker container ls -a
CONTAINER ID        IMAGE               COMMAND             CREATED            STATUS              PORTS           NAMES
13b5f78f0785        alpine:latest       "ping www.google.com"   27 seconds ago    Up 25 seconds          80/tcp          blissful_colden.2.xeelflowzyq7iqimy7uw06ezq
e12661eed38f        alpine:latest       "ping www.google.com"   27 seconds ago    Up 25 seconds          80/tcp          blissful_colden.3.0q5ap7ss5p01q2v7q2vb5je75
6f970d638464        alpine:latest       "ping www.google.com"   27 seconds ago    Up 25 seconds          80/tcp          blissful_colden.4.k19du08yg8rpkbw4d0zpouqjg
e079a2524723        alpine:latest       "ping www.google.com"   27 seconds ago    Up 25 seconds          80/tcp          blissful_colden.5.adx7wmnixaevipezay8vz7pk
6139a38c1336        alpine:latest       "ping www.google.com"   2 minutes ago     Up 2 minutes           80/tcp          nostalgic_wiles.1.pxz929n882ifseff8opp2h/n3
4bf47bda6bd        alpine:latest       "ping www.google.com"   8 minutes ago     Up 8 minutes           80/tcp          blissful_colden.1.g2intqtoexkzqiftn6u015b2i
root@ip-172-31-38-196:~#

```

i-0573903a63bba0a74 (manager)

PublicIPs: 13.201.122.122 PrivateIPs: 172.31.38.196

CloudShell Feedback © 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Screenshot of an AWS CloudShell session on a Mac OS X interface. The terminal window shows a series of Docker commands being run on an EC2 instance. The commands include creating a service, scaling it, and verifying its convergence. The session ends with the user logging out.

```

--tlskey string      Path to TLS key file (default "/root/.docker/key.pem")
--tlsv1Verify       Use TLS and verify the remote
-v, --version       Print version information and quit

Run 'docker COMMAND --help' for more information on a command.

For more help on how to use Docker, head to https://docs.docker.com/go/guides/

root@ip-172-31-38-196:~# docker service ls
ID          NAME      MODE      REPLICAS  IMAGE
2pxxxffaltm7  blissful_colden replicated 1/1    alpine:latest

root@ip-172-31-38-196:~# docker service ps 2pxxxffaltm7
ID          NAME      NODE      DESIRED STATE  CURRENT STATE      ERROR      PORTS
g2intqtoexxz  blissful_colden.1  ip-172-31-38-196  Running  3 minutes ago
root@ip-172-31-38-196:~# docker service create alpine ping www.google.com
ii7gihbsyqjjx5aqop9p2dit8
overall progress: 1 out of 1 tasks
1/1: running [=====>]
verify: Service ii7gihbsyqjjx5aqop9p2dit8 converged
root@ip-172-31-38-196:~# docker service ls
ID          NAME      MODE      REPLICAS  IMAGE
2pxxxffaltm7  blissful_colden replicated 1/1    alpine:latest
ii7gihbsyqjjx5aqop9p2dit8  nostalgic_wiles replicated 1/1    alpine:latest
root@ip-172-31-38-196:~# docker service scale 2pxxxffaltm7=5
2pxxxffaltm7 scaled to 5
overall progress: 5 out of 5 tasks
1/5: running [=====>]
2/5: running [=====>]
3/5: running [=====>]
4/5: running [=====>]
5/5: running [=====>]
verify: Service 2pxxxffaltm7 converged
root@ip-172-31-38-196:~#

```

i-0573903a63bba0a74 (manager)
PublicIPs: 13.201.122.122 PrivateIPs: 172.31.38.196

Screenshot of an AWS CloudShell session on a Mac OS X interface. The terminal window shows a series of Docker commands being run on an EC2 instance. The commands include listing containers, rolling back a service, and verifying its convergence. The session ends with the user logging out.

```

overall progress: 5 out of 5 tasks
1/5: running [=====>]
2/5: running [=====>]
3/5: running [=====>]
4/5: running [=====>]
5/5: running [=====>]
verify: Service 2pxxxffaltm7 converged
root@ip-172-31-38-196:~# docker service ls -a
unknown shorthand flag: 'a' in '-a'
See 'docker service ls --help'.
root@ip-172-31-38-196:~# docker container ls -a
CONTAINER ID        IMAGE               COMMAND             CREATED            STATUS              PORTS           NAMES
13b5f78f0785        alpine:latest      "ping www.google.com"   27 seconds ago   Up 25 seconds          Up 25 seconds          blissful_colden.2.xeelflowzyq7iqimy7uw06ezq
e12651ec38f         alpine:latest      "ping www.google.com"   27 seconds ago   Up 25 seconds          Up 25 seconds          blissful_colden.3.0q5ap7ss5p01qzv7g2vb5je75
6f970d638464        alpine:latest      "ping www.google.com"   27 seconds ago   Up 25 seconds          Up 25 seconds          blissful_colden.4.k19du08y9rpkbwd402pouugjg
e079a2524723        alpine:latest      "ping www.google.com"   27 seconds ago   Up 25 seconds          Up 25 seconds          blissful_colden.5.adx7wminixaevipezay8vz7pk
6139a38c1336        alpine:latest      "ping www.google.com"   2 minutes ago     Up 2 minutes          Up 2 minutes          nostalgic_wiles.1.pxz929h82ifsef8xopp2h7n3
4bf47ebda0bd        alpine:latest      "ping www.google.com"   8 minutes ago     Up 8 minutes          Up 8 minutes          blissful_colden.1.g2intqtoexkzqiftn6uol5b2i
root@ip-172-31-38-196:~# docker service ls
ID          NAME      MODE      REPLICAS  IMAGE
2pxxxffaltm7  blissful_colden replicated 5/5    alpine:latest
ii7gihbsyqjjx5aqop9p2dit8  nostalgic_wiles replicated 1/1    alpine:latest
root@ip-172-31-38-196:~# docker service rollback 2pxxxffaltm7
2pxxxffaltm7
overall progress: rolling back update: 1 out of 1 tasks
1/1: running [=====>]
verify: Service 2pxxxffaltm7 converged
rollback: rollback completed
root@ip-172-31-38-196:~# docker service ls
ID          NAME      MODE      REPLICAS  IMAGE
2pxxxffaltm7  blissful_colden replicated 1/1    alpine:latest
ii7gihbsyqjjx5aqop9p2dit8  nostalgic_wiles replicated 1/1    alpine:latest
root@ip-172-31-38-196:~#

```

i-0573903a63bba0a74 (manager)
PublicIPs: 13.201.122.122 PrivateIPs: 172.31.38.196

Step 3: Scale service and create worker node and create there token and roll back the service

- Docker service scale ID=5
- Docker service ps ID
- Docker service ls
- Docker container ls
- Docker service rollback ID

```

Safari File Edit View History Bookmarks Window Help
ap-south-1.console.aws.amazon.com/ec2-instance-connect/ssh?connType=star
Instances | EC2 | ap-south-1 EC2 Instance Connect | ap... Meet - ygr-fmjz-nap
AWS Services Search [Option+S]
EC2
5/5: running [=====]
verify: Service 2pxxxffaltm7 converged
root@ip-172-31-38-196:~# docker service ls -a
unknown shorthand flag: 'a' in -a
See 'docker service ls --help'.
root@ip-172-31-38-196:~# docker container ls -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
13b5f78f0785 alpine:latest "ping www.google.com" 27 seconds ago Up 25 seconds blissful_colden.2.xeelflowzyq7iqimy7uw06ezq
e12651ecd38f alpine:latest "ping www.google.com" 27 seconds ago Up 25 seconds blissful_colden.3.0q5ap7ss5p0iq2v7q2vb5je75
6f970d638464 alpine:latest "ping www.google.com" 27 seconds ago Up 25 seconds blissful_colden.4.kl9du08yg8rpkbw4d0zpoujg
e079a2524723 alpine:latest "ping www.google.com" 27 seconds ago Up 25 seconds blissful_colden.5.adx7wmminixaevipezay8vz7pk
6139a38c1336 alpine:latest "ping www.google.com" 2 minutes ago Up 2 minutes nostalgic_wiles.1.pxi929h82ifsef8xopp2h7n3
4bf47ebda6bd alpine:latest "ping www.google.com" 8 minutes ago Up 8 minutes blissful_Colden.1.g2intqtoexkzqiftn6uol5b2i
root@ip-172-31-38-196:~# docker service ls
ID NAME MODE REPLICAS IMAGE PORTS
2pxxxffaltm7 blissful_colden replicated 5/5 alpine:latest
i17gihbsyqjij nostalgic_wiles replicated 1/1 alpine:latest
root@ip-172-31-38-196:~# docker service rollback 2pxxxffaltm7
2pxxxffaltm7
overall progress: rolling back update: 1 out of 1 tasks
1/1: running [=====]
verify: Service 2pxxxffaltm7 converged
rollback: rollback completed
root@ip-172-31-38-196:~# docker swarm join-token worker
to add a worker to this swarm, run the following command:
  docker swarm join --token SWMTKN-1-6dfjusy645o29krgp2gzm8hz19odbkqt8p0dwkkhkme5eu5xe-dlumy4we4xh9ih5vol17mrlj5 172.31.38.196:2377
root@ip-172-31-38-196:~# 

i-0573903a63bb0a74 (manager)
PublicIPs: 13.201.122.122 PrivateIPs: 172.31.38.196

```

CloudShell Feedback © 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Step 3: create 2 instance on aws and install docker and configure it and connect it through token .

- Docker swarm join -token worker
(copy and paste in all three instances |)
- Docker node ls
- Docker service create -replicas 5 alpine ping www.dypiu.ac.in
- Docker service ls
- Docker ps ID
- Docker container ls
- Docker service scale ID=10
- Docker service ps ID
- Docker node ls

```

Network: bridge host ipvlan macvlan null overlay
Log: awslogs fluentd gcplogs gelf journald json-file local splunk syslog
Swarm: inactive
Runtimes: io.containerd.runc.v2 runc
Default Runtime: runc
Init Binary: docker-init
containerd version: ae07eda36dd25f8alb98dfbf587313b99c0190bb
runc version: v1.1.12-0-g51d5e94
init version: de40ad0
Security Options:
    apparmor
    seccomp
    Profile: builtin
    cgroups
Kernel Version: 6.5.0-1014-aws
Operating System: Ubuntu 22.04.4 LTS
OSType: linux
Architecture: x86_64
CPUs: 1
Total Memory: 949.2MiB
Name: ip-172-31-39-139
ID: 62789543-f342-45c4-9526-5d3169bf2003
Docker Root Dir: /var/lib/docker
Debug Mode: false
Experimental: false
Insecure Registries:
  127.0.0.0/8
Live Restore Enabled: false
root@ip-172-31-39-139:~# docker swarm join --token SWMTKN-1-19j52xs9nwmns3gxm67q59gtsufkzh32dgql4seta6m7cmt4-f515xocgb5a82e6ef5g91ynyl 172.31.36.74:2377
7
This node joined a swarm as a worker.
root@ip-172-31-39-139:~#

```

i-05ddb89d018586c53 (worker 1)

PublicIPs: 13.201.54.95 PrivateIPs: 172.31.39.139

```

Volume: local
Network: bridge host ipvlan macvlan null overlay
Log: awslogs fluentd gcplogs gelf journald json-file local splunk syslog
Swarm: inactive
Runtimes: io.containerd.runc.v2 runc
Default Runtime: runc
Init Binary: docker-init
containerd version: ae07eda36dd25f8alb98dfbf587313b99c0190bb
runc version: v1.1.12-0-g51d5e94
init version: de40ad0
Security Options:
    apparmor
    seccomp
    Profile: builtin
    cgroups
Kernel Version: 6.5.0-1014-aws
Operating System: Ubuntu 22.04.4 LTS
OSType: linux
Architecture: x86_64
CPUs: 1
Total Memory: 949.2MiB
Name: ip-172-31-44-2
ID: a36e06ae-a779-407c-a12c-cb3fc3172cf1
Docker Root Dir: /var/lib/docker
Debug Mode: false
Experimental: false
Insecure Registries:
  127.0.0.0/8
Live Restore Enabled: false
root@ip-172-31-44-2:~# docker swarm join --token SWMTKN-1-19j52xs9nwmns3gxm67q59gtsufkzh32dgql4seta6m7cmt4-f515xocgb5a82e6ef5g91ynyl 172.31.36.74:2377
7
This node joined a swarm as a worker.
root@ip-172-31-44-2:~#

```

i-0be3d379f5a32ee11 (worker 2)

PublicIPs: 3.110.143.65 PrivateIPs: 172.31.44.2

```

OSType: linux
Architecture: x86_64
CPUs: 1
Total Memory: 949.2MiB
Name: ip-172-31-36-74
ID: ffe1c1a9-7b35-4079-bf28-a0a60072fba0
Docker Root Dir: /var/lib/docker
Debug Mode: false
Experimental: false
Insecure Registries:
127.0.0.0/8
Live Restore Enabled: false

root@ip-172-31-36-74:~# docker swarm init
Swarm initialized: current node (txldlbn85sejdhvgt21lbbf5) is now a manager.

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

  docker swarm join --token SWMTKN-1-19j52xs9nwmns3gxm67q59gtsufkzh32dgql4seta6m7cmt4-f515xocgb5a82e6ef5g9lyny1 172.31.36.74:2377

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

root@ip-172-31-36-74:~# docker swarm join-token worker
To add a worker to this swarm, run the following command:

  docker swarm join --token SWMTKN-1-19j52xs9nwmns3gxm67q59gtsufkzh32dgql4seta6m7cmt4-f515xocgb5a82e6ef5g9lyny1 172.31.36.74:2377

root@ip-172-31-36-74:~# docker node ls
ID           HOSTNAME   STATUS  AVAILABILITY  MANAGER STATUS    ENGINE VERSION
txldlbn85sejdhvgt21lbbf5 *  ip-172-31-36-74  Ready   Active        Leader      26.0.0
kbkieef2oes5revovsquy3dv  ip-172-31-39-139  Ready   Active        26.0.0
ervijtezltw40mpxjg02fsnt4 ip-172-31-44-2   Ready   Active        26.0.0

root@ip-172-31-36-74:~#

```

i-0d50f03268ac351fa (manager)

Public IPs: 13.201.123.41 Private IPs: 172.31.36.74

[CloudShell](#) [Feedback](#)

© 2024, Amazon Web Services, Inc. or its affiliates. [Privacy](#) [Terms](#) [Cookie preferences](#)

End of the practical

Sign

Subject In charge

(Dr. Swapnil D. waghmare)