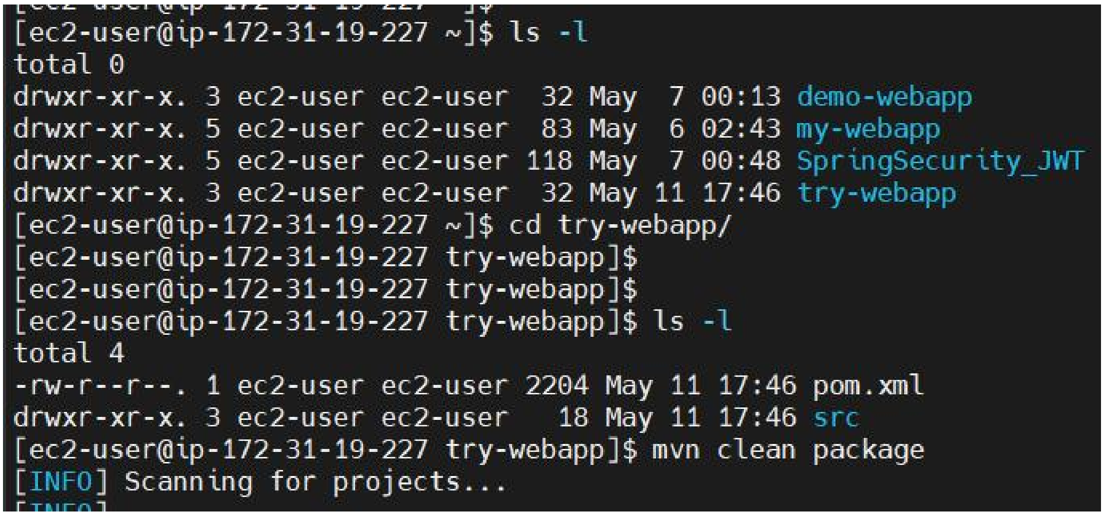
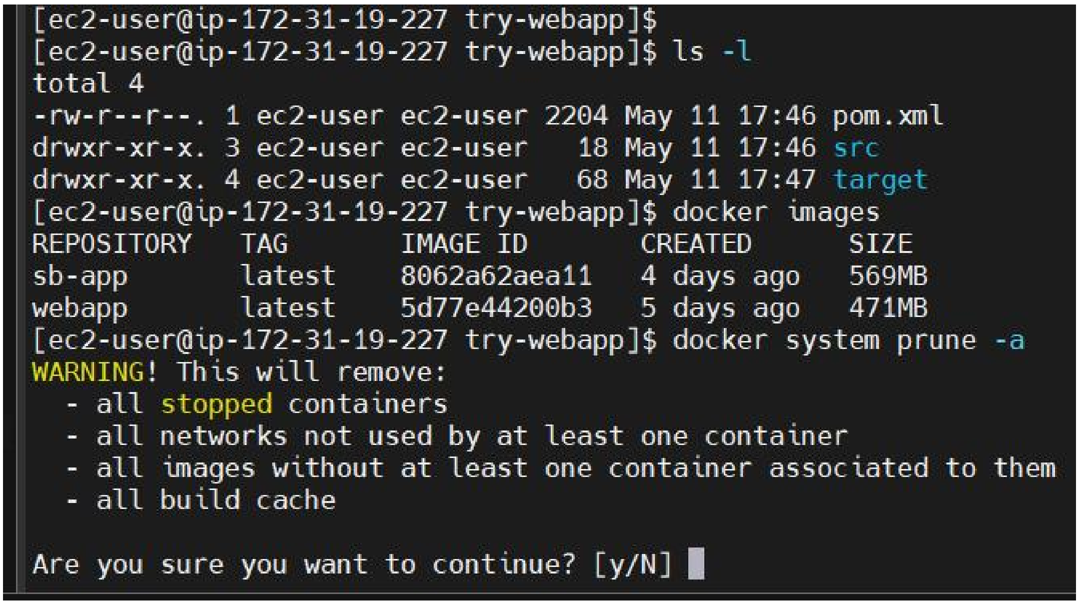
Docker 3:

```
mvn archetype:generate -DgroupId=com.example   -DartifactId=demo-webapp   -DarchetypeArtifactId=maven-archetype-webapp   -DarchetypeVersion=1.4   -DinteractiveMode=false
```

```
[ec2-user@ip-172-31-19-227 ~]$ mvn archetype:generate -DgroupId=com.example   -DartifactId=try-webapp   -DarchetypeArtifactId=maven-archetype-webapp   -DarchetypeVersion=1.4   -DinteractiveMode=false
```

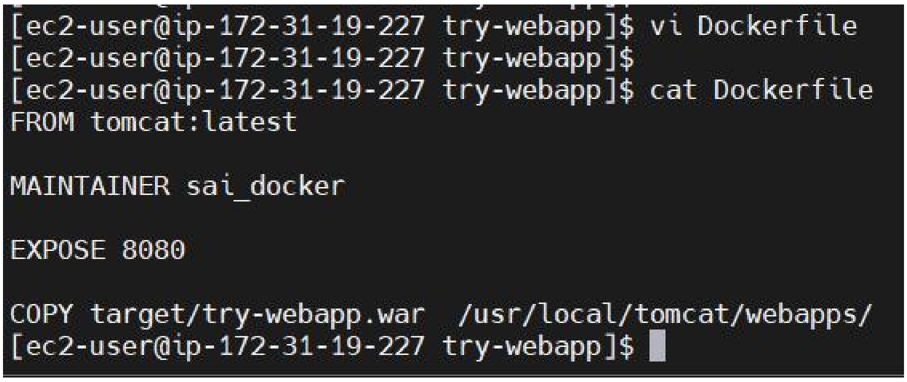


```
[ec2-user@ip-172-31-19-227 ~]$ ls -l
total 0
drwxr-xr-x. 3 ec2-user ec2-user  32 May  7 00:13 demo-webapp
drwxr-xr-x. 5 ec2-user ec2-user  83 May  6 02:43 my-webapp
drwxr-xr-x. 5 ec2-user ec2-user 118 May  7 00:48 SpringSecurity_JWT
drwxr-xr-x. 3 ec2-user ec2-user  32 May 11 17:46 try-webapp
[ec2-user@ip-172-31-19-227 ~]$ cd try-webapp/
[ec2-user@ip-172-31-19-227 try-webapp]$
[ec2-user@ip-172-31-19-227 try-webapp]$
[ec2-user@ip-172-31-19-227 try-webapp]$ ls -l
total 4
-rw-r--r--. 1 ec2-user ec2-user 2204 May 11 17:46 pom.xml
drwxr-xr-x. 3 ec2-user ec2-user   18 May 11 17:46 src
[ec2-user@ip-172-31-19-227 try-webapp]$ mvn clean package
[INFO] Scanning for projects...
```



```
[ec2-user@ip-172-31-19-227 try-webapp]$
[ec2-user@ip-172-31-19-227 try-webapp]$ ls -l
total 4
-rw-r--r--. 1 ec2-user ec2-user 2204 May 11 17:46 pom.xml
drwxr-xr-x. 3 ec2-user ec2-user   18 May 11 17:46 src
drwxr-xr-x. 4 ec2-user ec2-user   68 May 11 17:47 target
[ec2-user@ip-172-31-19-227 try-webapp]$ docker images
REPOSITORY   TAG       IMAGE ID       CREATED      SIZE
sb-app       latest    8062a62aea11   4 days ago   569MB
webapp       latest    5d77e44200b3   5 days ago   471MB
[ec2-user@ip-172-31-19-227 try-webapp]$ docker system prune -a
WARNING! This will remove:
  - all stopped containers
  - all networks not used by at least one container
  - all images without at least one container associated to them
  - all build cache

Are you sure you want to continue? [y/N]
```

```
[ec2-user@ip-172-31-19-227 try-webapp]$ vi Dockerfile
[ec2-user@ip-172-31-19-227 try-webapp]$
[ec2-user@ip-172-31-19-227 try-webapp]$ cat Dockerfile
FROM tomcat:latest

MAINTAINER sai_docker

EXPOSE 8080

COPY target/try-webapp.war  /usr/local/tomcat/webapps/
```

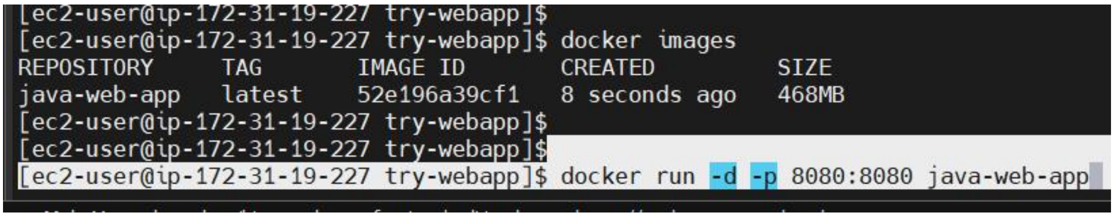


```
[ec2-user@ip-172-31-19-227 try-webapp]$ vi Dockerfile
[ec2-user@ip-172-31-19-227 try-webapp]$
[ec2-user@ip-172-31-19-227 try-webapp]$ cat Dockerfile
FROM tomcat:latest

MAINTAINER sai_docker

EXPOSE 8080

COPY target/try-webapp.war  /usr/local/tomcat/webapps/
[ec2-user@ip-172-31-19-227 try-webapp]$
```

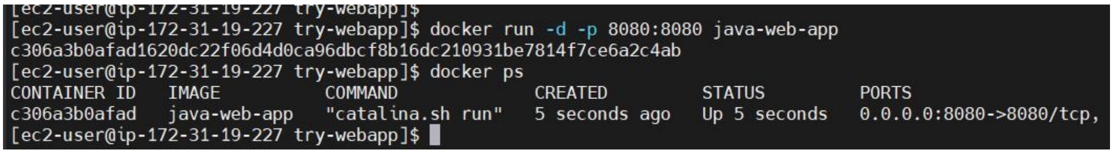
[ec2-user@ip-172-31-19-227 try-webapp]$ docker build -t java-web-app .

```
REPOSITORY    TAG     IMAGE ID      CREATED        SIZE
java-web-app  latest  52e196a39cf1  8 seconds ago  468MB
```

[ec2-user@ip-172-31-19-227 try-webapp]$ docker run -d -p 8080:8080 java-web-app

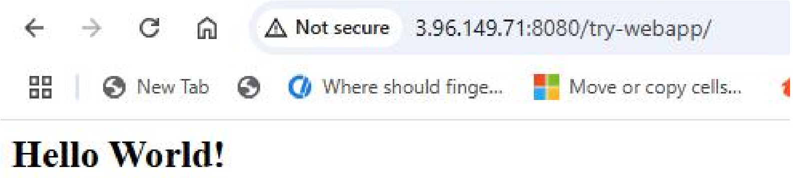


```
[ec2-user@ip-172-31-19-227 try-webapp]$
[ec2-user@ip-172-31-19-227 try-webapp]$ docker images
REPOSITORY     TAG       IMAGE ID       CREATED         SIZE
java-web-app   latest    52e196a39cf1   8 seconds ago   468MB
[ec2-user@ip-172-31-19-227 try-webapp]$
[ec2-user@ip-172-31-19-227 try-webapp]$
[ec2-user@ip-172-31-19-227 try-webapp]$ docker run -d -p 8080:8080 java-web-app
```



```
[ec2-user@ip-172-31-19-227 try-webapp]$
[ec2-user@ip-172-31-19-227 try-webapp]$ docker run -d -p 8080:8080 java-web-app
c306a3b0afad1620dc22f06d4d0ca96dbcf8b16dc210931be7814f7ce6a2c4ab
[ec2-user@ip-172-31-19-227 try-webapp]$ docker ps
CONTAINER ID   IMAGE          COMMAND             CREATED         STATUS         PORTS
c306a3b0afad   java-web-app   "catalina.sh run"   5 seconds ago   Up 5 seconds   0.0.0.0:8080->8080/tcp,
[ec2-user@ip-172-31-19-227 try-webapp]$
```

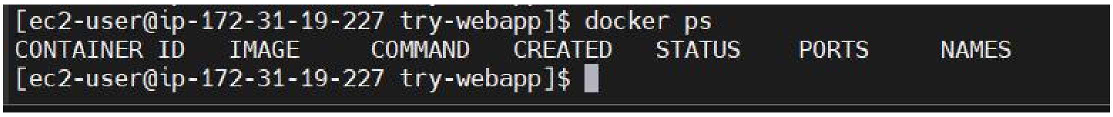
http://3.96.149.71:8080/try-webapp/



Hello World!

[ec2-user@ip-172-31-19-227 try-webapp]$ docker logs c306a3b0afad

[ec2-user@ip-172-31-19-227 try-webapp]$ docker stop c306a3b0afad
c306a3b0afad



```
[ec2-user@ip-172-31-19-227 try-webapp]$ docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
[ec2-user@ip-172-31-19-227 try-webapp]$
```

Create a Maven Java web application or clone the existing Java web app from Github

```
mvn archetype:generate -DgroupId=com.example   -DartifactId=try-webapp   -
DarchetypeArtifactId=maven-archetype-webapp   -DarchetypeVersion=1.4   -DinteractiveMode=false
```

Go inside that web app
cd my-web-app
mvn clean package --> to create target folder and war file inside it
Create a Dockerfile
vi Dockerfile --->

```
[ec2-user@ip-172-31-19-227 try-webapp]$ cat Dockerfile
FROM tomcat:latest
MAINTAINER sai_docker
EXPOSE 8080
COPY target/try-webapp.war  /usr/local/tomcat/webapps/
```

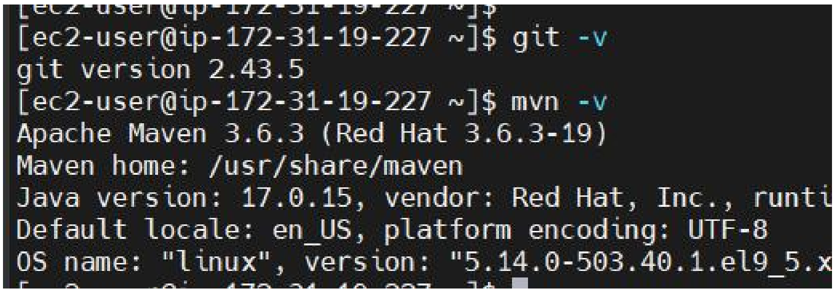
```
docker build -t java-web-app
docker images
docker run -d -p 8080:8080 java-web-app
```

==> Enable 8080 in security group of host machine and using public IP of the host machone try to access the web app from the browser

<public IP>:8080/my-web-app/ to see the result

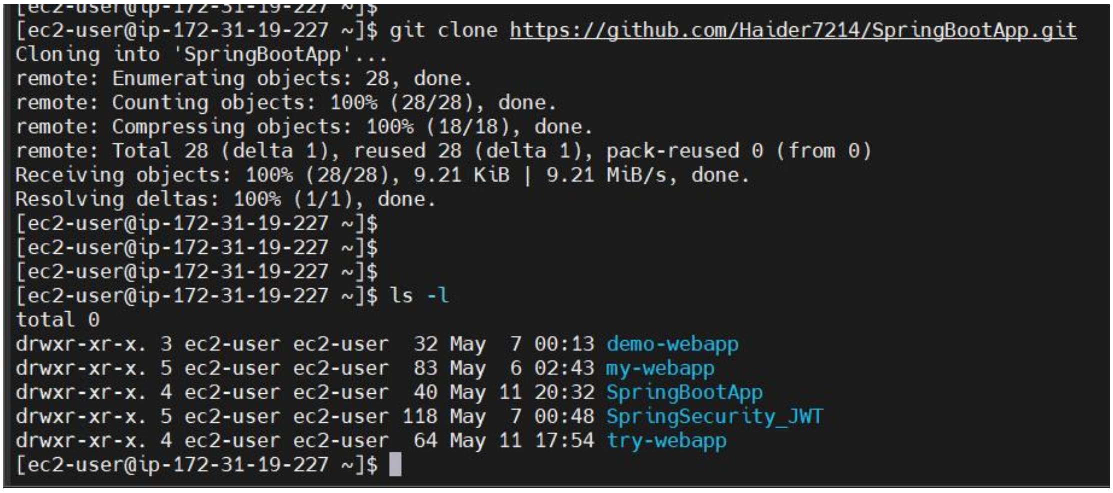
Dockerizing Springboot application:
Springboot is one of the frameworks to develop Java-based applications
Tomcat will already be there inside Springboot application
Springboot internally uses one embedded-tomcat server
So when using Springboot we don’t need Tomcat server separately

```
[ec2-user@ip-172-31-19-227 ~]$ git -v
git version 2.43.5
[ec2-user@ip-172-31-19-227 ~]$ mvn -v
Apache Maven 3.6.3 (Red Hat 3.6.3-19)
Maven home: /usr/share/maven
Java version: 17.0.15, vendor: Red Hat, Inc., runtime: /usr/lib/jvm/java-17-openjdk-17.0.15.0.6-
2.el9.x86_64
Default locale: en_US, platform encoding: UTF-8
OS name: "linux", version: "5.14.0-503.40.1.el9_5.x86_64", arch: "amd64", family: "unix"
```



```
[ec2-user@ip-172-31-19-227 ~]$
[ec2-user@ip-172-31-19-227 ~]$ git -v
git version 2.43.5
[ec2-user@ip-172-31-19-227 ~]$ mvn -v
Apache Maven 3.6.3 (Red Hat 3.6.3-19)
Maven home: /usr/share/maven
Java version: 17.0.15, vendor: Red Hat, Inc., runti
Default locale: en_US, platform encoding: UTF-8
OS name: "linux", version: "5.14.0-503.40.1.el9_5.x
```

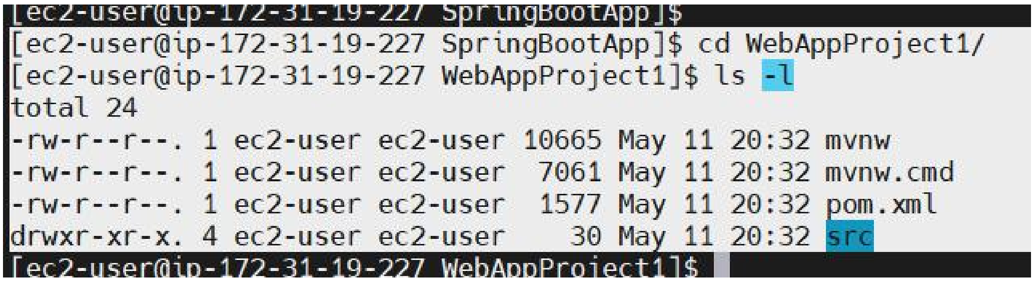
```
[ec2-user@ip-172-31-19-227 ~]$ git clone https://github.com/Haider7214/SpringBootApp.git
```



```
[ec2-user@ip-172-31-19-227 ~]$
[ec2-user@ip-172-31-19-227 ~]$ git clone https://github.com/Haider7214/SpringBootApp.git
Cloning into 'SpringBootApp'...
remote: Enumerating objects: 28, done.
remote: Counting objects: 100% (28/28), done.
remote: Compressing objects: 100% (18/18), done.
remote: Total 28 (delta 1), reused 28 (delta 1), pack-reused 0 (from 0)
Receiving objects: 100% (28/28), 9.21 KiB | 9.21 MiB/s, done.
Resolving deltas: 100% (1/1), done.
[ec2-user@ip-172-31-19-227 ~]$
[ec2-user@ip-172-31-19-227 ~]$
[ec2-user@ip-172-31-19-227 ~]$
[ec2-user@ip-172-31-19-227 ~]$ ls -l
total 0
drwxr-xr-x. 3 ec2-user ec2-user  32 May  7 00:13 demo-webapp
drwxr-xr-x. 5 ec2-user ec2-user  83 May  6 02:43 my-webapp
drwxr-xr-x. 4 ec2-user ec2-user  40 May 11 20:32 SpringBootApp
drwxr-xr-x. 5 ec2-user ec2-user 118 May  7 00:48 SpringSecurity_JWT
drwxr-xr-x. 4 ec2-user ec2-user  64 May 11 17:54 try-webapp
[ec2-user@ip-172-31-19-227 ~]$
```

```
[ec2-user@ip-172-31-19-227 ~]$ cd SpringBootApp/
[ec2-user@ip-172-31-19-227 SpringBootApp]$ ls -l
total 0
drwxr-xr-x. 4 ec2-user ec2-user 112 May 11 20:32 WebAppProject1
```

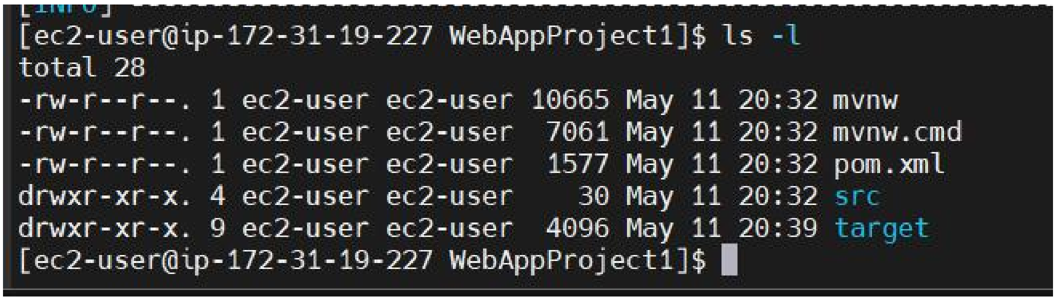
```
[ec2-user@ip-172-31-19-227 SpringBootApp]$ cd WebAppProject1/
[ec2-user@ip-172-31-19-227 WebAppProject1]$ ls -l
total 24
-rw-r--r--. 1 ec2-user ec2-user 10665 May 11 20:32 mvnw
-rw-r--r--. 1 ec2-user ec2-user  7061 May 11 20:32 mvnw.cmd
-rw-r--r--. 1 ec2-user ec2-user  1577 May 11 20:32 pom.xml
drwxr-xr-x. 4 ec2-user ec2-user    30 May 11 20:32 src
```



```
[ec2-user@ip-172-31-19-227 SpringBootApp]$
[ec2-user@ip-172-31-19-227 SpringBootApp]$ cd WebAppProject1/
[ec2-user@ip-172-31-19-227 WebAppProject1]$ ls -l
total 24
-rw-r--r--. 1 ec2-user ec2-user 10665 May 11 20:32 mvnw
-rw-r--r--. 1 ec2-user ec2-user  7061 May 11 20:32 mvnw.cmd
-rw-r--r--. 1 ec2-user ec2-user  1577 May 11 20:32 pom.xml
drwxr-xr-x. 4 ec2-user ec2-user    30 May 11 20:32 src
[ec2-user@ip-172-31-19-227 WebAppProject1]$
```

There is no target folder, how do we get target folder?

```
[ec2-user@ip-172-31-19-227 WebAppProject1]$ mvn clean package
```



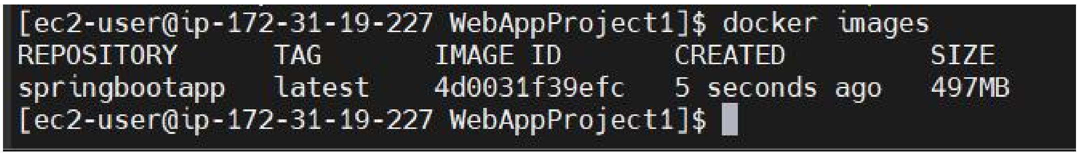
```
[INFO] ------------------------------------------------------------------------
[ec2-user@ip-172-31-19-227 WebAppProject1]$ ls -l
total 28
-rw-r--r--. 1 ec2-user ec2-user 10665 May 11 20:32 mvnw
-rw-r--r--. 1 ec2-user ec2-user  7061 May 11 20:32 mvnw.cmd
-rw-r--r--. 1 ec2-user ec2-user  1577 May 11 20:32 pom.xml
drwxr-xr-x. 4 ec2-user ec2-user    30 May 11 20:32 src
drwxr-xr-x. 9 ec2-user ec2-user  4096 May 11 20:39 target
[ec2-user@ip-172-31-19-227 WebAppProject1]$
```

Now we see the target folder

```
[ec2-user@ip-172-31-19-227 WebAppProject1]$ cat Dockerfile
FROM openjdk:17
MAINTAINER sai_docker
COPY target/WebAppProject1-0.0.1.jar  /usr/app/
WORKDIR /usr/app/
EXPOSE 8080
ENTRYPOINT ["java", "-jar", "WebAppProject1-0.0.1.jar"]
```

```
[ec2-user@ip-172-31-19-227 WebAppProject1]$ docker build -t springbootapp .
```

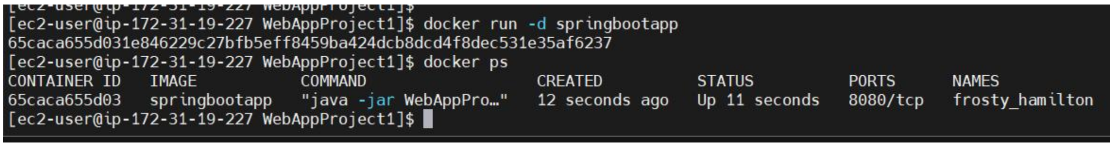
```
[ec2-user@ip-172-31-19-227 WebAppProject1]$ docker images
REPOSITORY     TAG      IMAGE ID      CREATED        SIZE
springbootapp   latest    4d0031f39efc   5 seconds ago   497MB
```



```
[ec2-user@ip-172-31-19-227 WebAppProject1]$ docker images
REPOSITORY      TAG       IMAGE ID       CREATED          SIZE
springbootapp   latest    4d0031f39efc   5 seconds ago    497MB
[ec2-user@ip-172-31-19-227 WebAppProject1]$
```

```
[ec2-user@ip-172-31-19-227 WebAppProject1]$ docker run -d springbootapp
```

```
[ec2-user@ip-172-31-19-227 WebAppProject1]$ docker ps
CONTAINER ID   IMAGE         COMMAND              CREATED        STATUS         PORTS      NAMES
65caca655d03   springbootapp   "java -jar WebAppPro…"   12 seconds ago   Up 11 seconds   8080/tcp
frosty_hamilton
```



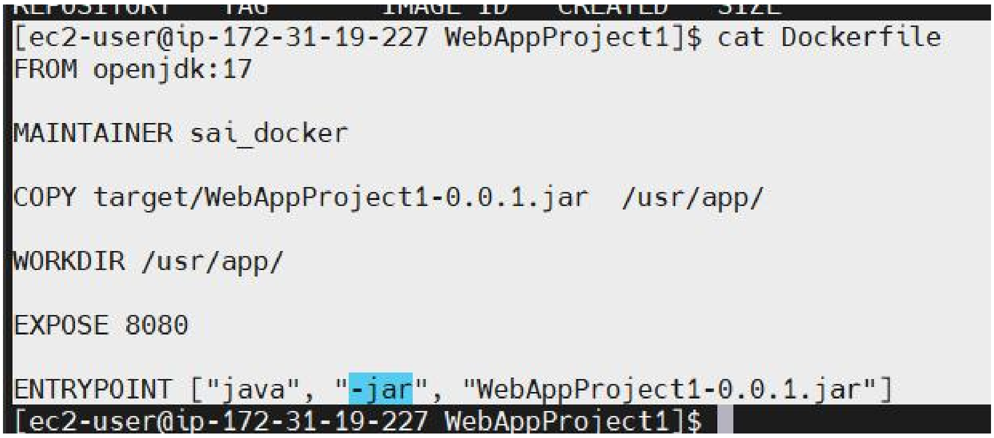
```
[ec2-user@ip-172-31-19-227 WebAppProject1]$
[ec2-user@ip-172-31-19-227 WebAppProject1]$ docker run -d springbootapp
65caca655d031e846229c27bfb5eff8459ba424dcb8dcd4f8dec531e35af6237
[ec2-user@ip-172-31-19-227 WebAppProject1]$ docker ps
CONTAINER ID   IMAGE           COMMAND                  CREATED          STATUS          PORTS      NAMES
65caca655d03   springbootapp   "java -jar WebAppPro…"   12 seconds ago   Up 11 seconds   8080/tcp   frosty_hamilton
[ec2-user@ip-172-31-19-227 WebAppProject1]$
```

If we have to manage multiple containers, that’s where docker-compose comes into picture

```
[ec2-user@ip-172-31-19-227 WebAppProject1]$ docker stop 65caca655d03
65caca655d03
```

Dockerizing SpringBoot App
Clone existing SpringBoot app from Github
(Make sure git and maven are installed)

```
git clone <repo-link>
git clone https://github.com/Haider7214/SpringBootApp.git
cd SpringBootApp
mvn clean package (Create a target folder)
```



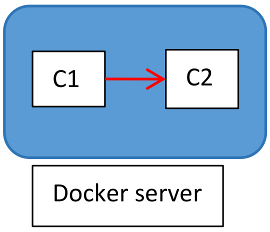
```
REPOSITORY    TAG        IMAGE ID    CREATED    SIZE
[ec2-user@ip-172-31-19-227 WebAppProject1]$ cat Dockerfile
FROM openjdk:17

MAINTAINER sai_docker

COPY target/WebAppProject1-0.0.1.jar  /usr/app/

WORKDIR /usr/app/

EXPOSE 8080

ENTRYPOINT ["java", "-jar", "WebAppProject1-0.0.1.jar"]
[ec2-user@ip-172-31-19-227 WebAppProject1]$
```

[ec2-user@ip-172-31-19-227 SpringBootApp]$ docker run -d -p 8080:8080 springbootapp .

Later we stop the container and delete if not in use

Summary:
Application Architecture
Tech Stack
Application Environments
Challenges in app deployment process
Need for Docker
Containerization and Docker
Docker Architecture
Dockerfile, Docker image, Docker registry (Docker hub), Docker containers
Dockerfile --> Keyword
Docker port mapping and Detached mode
Dockerizing Java web application (.war)
Dockerizing Java Springboot app (.jar) file

Docker Network:
Say one container wants to communicate to another container. Say SpringBoot container wants to communicate to DB (MySQL). that's where docker network comes into picture. C1 is container 1 and C2 is container 2



--> Network is all about communication and Docker network is used to provide isolated network for containers
--> If we run two containers under same network then these two containers can communicate with each other
--> By default, 3 default networks are available in Docker -> bridge, host, none
None means no network is available
Whenever we have standalone containers, then we go with the bridge network

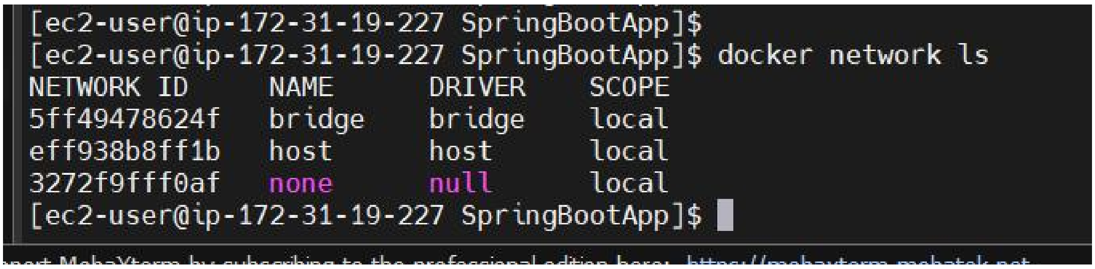
Out of three, Bridge network is the default network for docker container --> it is used to run standalone containers and it will assign one IP for container

Host network is also used to run standalone containers and it will not assign an IP for our containers

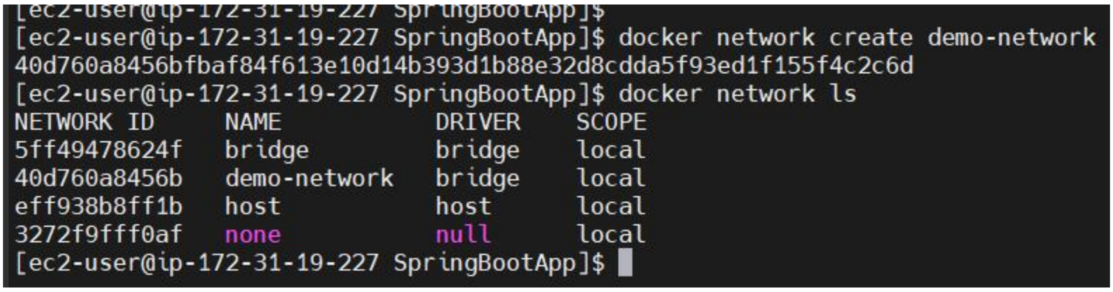
None refers to no network will be available for containers

Docker Networking - Other Network types
Overlay network (used for Orchestration purpose) and Macvlan network (assign a real physical IP address from your LAN to container). if you want to assign physical IP address to your container then use Macvlan network

```
[ec2-user@ip-172-31-19-227 SpringBootApp]$ docker network ls
NETWORK ID     NAME      DRIVER    SCOPE
5ff49478624f   bridge    bridge    local
eff938b8ff1b   host      host      local
3272f9fff0af   none      null      local
```



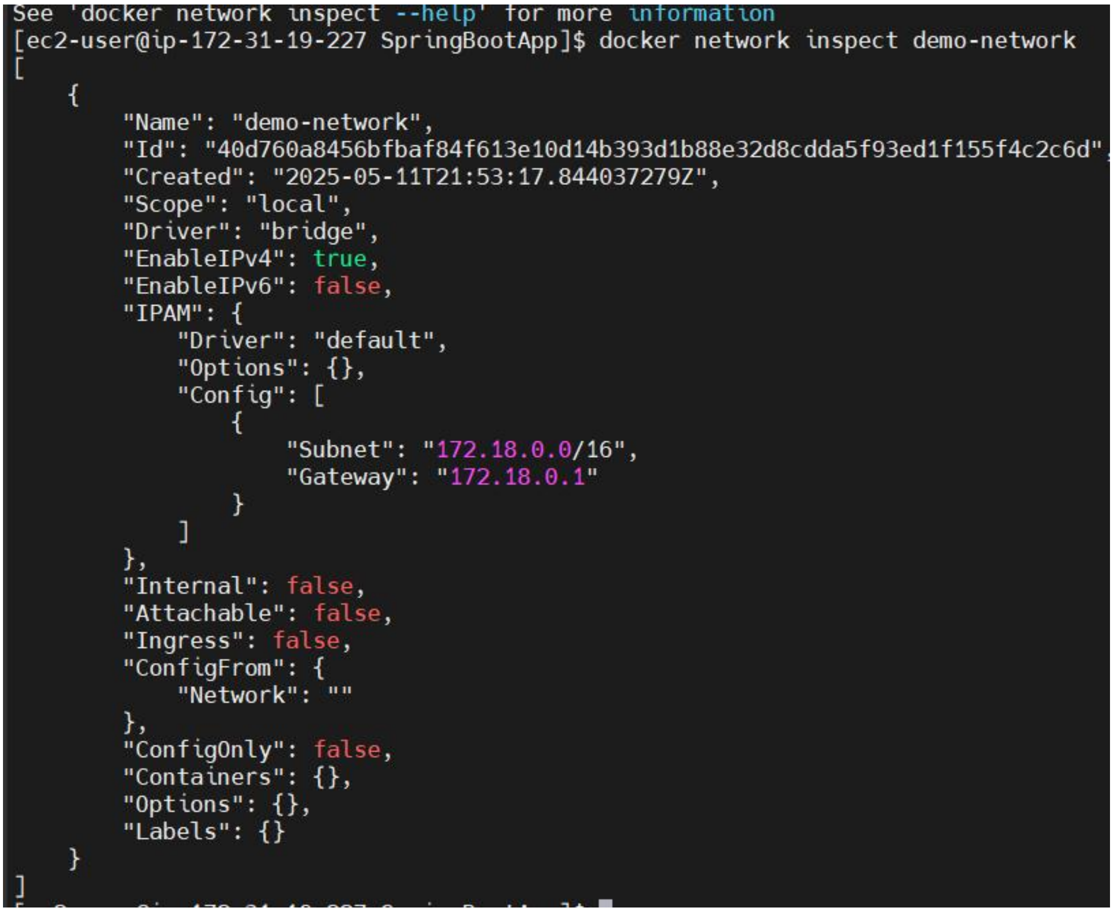
```
[ec2-user@ip-172-31-19-227 SpringBootApp]$
[ec2-user@ip-172-31-19-227 SpringBootApp]$ docker network ls
NETWORK ID     NAME      DRIVER    SCOPE
5ff49478624f   bridge    bridge    local
eff938b8ff1b   host      host      local
3272f9fff0af   none      null      local
[ec2-user@ip-172-31-19-227 SpringBootApp]$
```



```
[ec2-user@ip-172-31-19-227 SpringBootApp]$
[ec2-user@ip-172-31-19-227 SpringBootApp]$ docker network create demo-network
40d760a8456bfbaf84f613e10d14b393d1b88e32d8cdda5f93ed1f155f4c2c6d
[ec2-user@ip-172-31-19-227 SpringBootApp]$ docker network ls
NETWORK ID     NAME           DRIVER    SCOPE
5ff49478624f   bridge         bridge    local
40d760a8456b   demo-network   bridge    local
eff938b8ff1b   host           host      local
3272f9fff0af   none           null      local
[ec2-user@ip-172-31-19-227 SpringBootApp]$
```

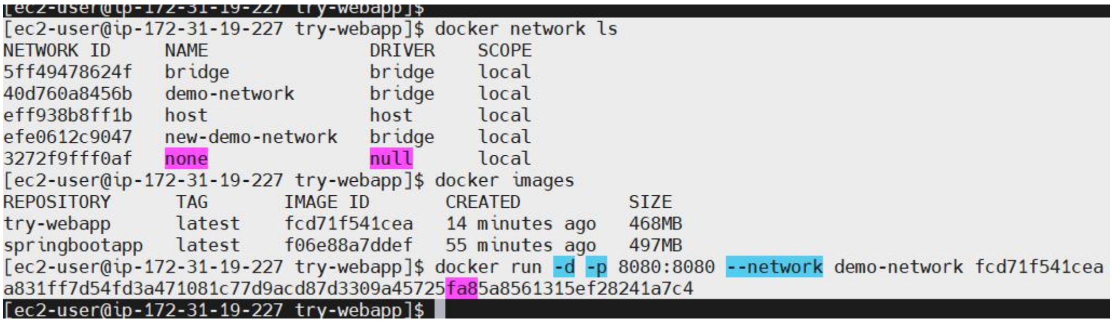
Default configuration is there

```
[ec2-user@ip-172-31-19-227 SpringBootApp]$ docker network inspect demo-network
[
    {
        "Name": "demo-network",
        "Id": "40d760a8456bfbaf84f613e10d14b393d1b88e32d8cdda5f93ed1f155f4c2c6d",
        "Created": "2025-05-11T21:53:17.844037279Z",
        "Scope": "local",
        "Driver": "bridge",
        "EnableIPv4": true,
        "EnableIPv6": false,
        "IPAM": {
            "Driver": "default",
            "Options": {},
            "Config": [
                {
                    "Subnet": "172.18.0.0/16",
                    "Gateway": "172.18.0.1"
                }
            ]
        },
        "Internal": false,
        "Attachable": false,
        "Ingress": false,
    "ConfigFrom": {
      "Network": ""
    },
    "ConfigOnly": false,
    "Containers": {},
    "Options": {},
    "Labels": {}
  }
]
```



```
See 'docker network inspect --help' for more information
[ec2-user@ip-172-31-19-227 SpringBootApp]$ docker network inspect demo-network
[
    {
        "Name": "demo-network",
        "Id": "40d760a8456bfbaf84f613e10d14b393d1b88e32d8cdda5f93ed1f155f4c2c6d",
        "Created": "2025-05-11T21:53:17.844037279Z",
        "Scope": "local",
        "Driver": "bridge",
        "EnableIPv4": true,
        "EnableIPv6": false,
        "IPAM": {
            "Driver": "default",
            "Options": {},
            "Config": [
                {
                    "Subnet": "172.18.0.0/16",
                    "Gateway": "172.18.0.1"
                }
            ]
        },
        "Internal": false,
        "Attachable": false,
        "Ingress": false,
        "ConfigFrom": {
            "Network": ""
        },
        "ConfigOnly": false,
        "Containers": {},
        "Options": {},
        "Labels": {}
    }
]
```

```
[ec2-user@ip-172-31-19-227 try-webapp]$ docker network ls
NETWORK ID     NAME              DRIVER    SCOPE
5ff49478624f   bridge            bridge    local
40d760a8456b   demo-network      bridge    local
eff938b8ff1b   host              host      local
efe0612c9047   new-demo-network  bridge    local
3272f9fff0af   none              null      local
[ec2-user@ip-172-31-19-227 try-webapp]$ docker images
REPOSITORY      TAG       IMAGE ID       CREATED          SIZE
try-webapp      latest    fcd71f541cea   14 minutes ago   468MB
springbootapp   latest    f06e88a7ddef   55 minutes ago   497MB
[ec2-user@ip-172-31-19-227 try-webapp]$ docker run -d -p 8080:8080 --network demo-network
fcd71f541cea
a831ff7d54fd3a471081c77d9acd87d3309a45725fa85a8561315ef28241a7c4
```

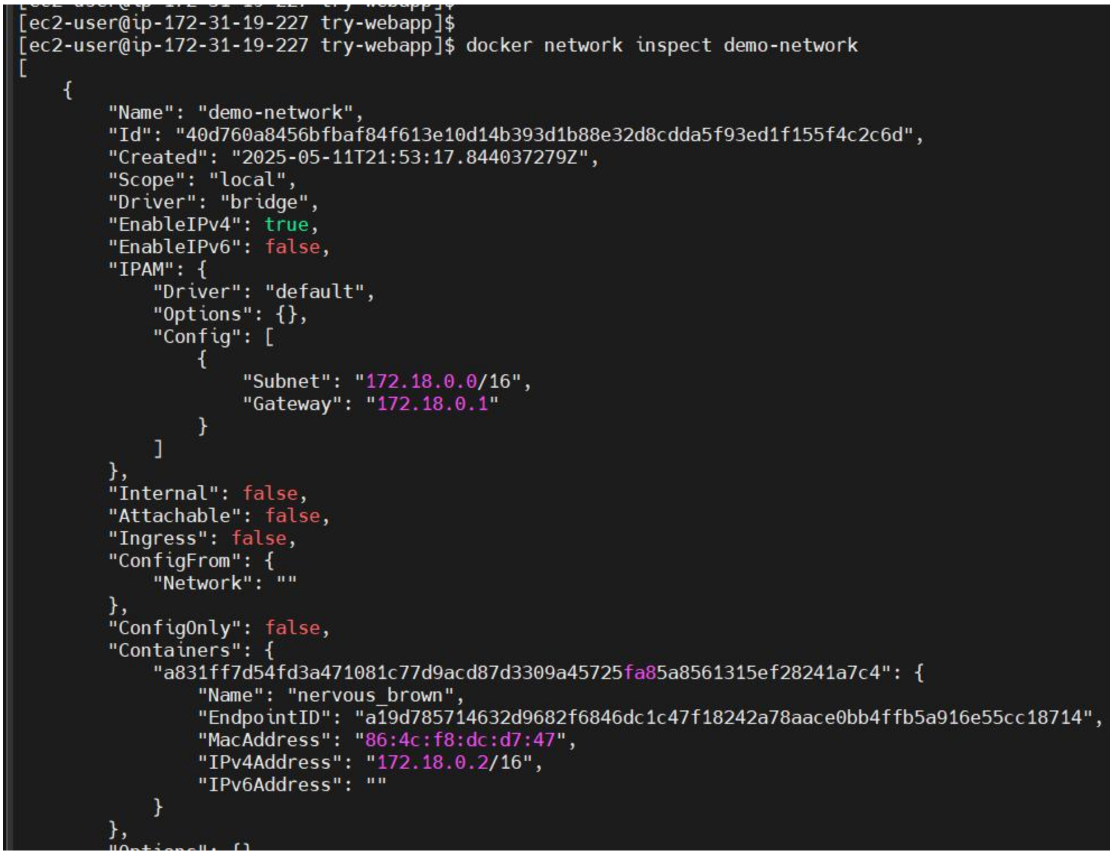


```
[ec2-user@ip-172-31-19-227 try-webapp]$
[ec2-user@ip-172-31-19-227 try-webapp]$ docker network ls
NETWORK ID     NAME               DRIVER    SCOPE
5ff49478624f   bridge             bridge    local
40d760a8456b   demo-network       bridge    local
eff938b8ff1b   host               host      local
efe0612c9047   new-demo-network   bridge    local
3272f9fff0af   none               null      local
[ec2-user@ip-172-31-19-227 try-webapp]$ docker images
REPOSITORY      TAG       IMAGE ID       CREATED          SIZE
try-webapp      latest    fcd71f541cea   14 minutes ago   468MB
springbootapp   latest    f06e88a7ddef   55 minutes ago   497MB
[ec2-user@ip-172-31-19-227 try-webapp]$ docker run -d -p 8080:8080 --network demo-network fcd71f541cea
a831ff7d54fd3a471081c77d9acd87d3309a45725fa85a8561315ef28241a7c4
[ec2-user@ip-172-31-19-227 try-webapp]$
```

```
[ec2-user@ip-172-31-19-227 try-webapp]$ docker network inspect demo-network
[
  {
    "Name": "demo-network",
    "Id": "40d760a8456bfbaf84f613e10d14b393d1b88e32d8cdda5f93ed1f155f4c2c6d",
    "Created": "2025-05-11T21:53:17.844037279Z",
    "Scope": "local",
    "Driver": "bridge",
    "EnableIPv4": true,
    "EnableIPv6": false,
    "IPAM": {
      "Driver": "default",
      "Options": {},
      "Config": [
        {
          "Subnet": "172.18.0.0/16",
          "Gateway": "172.18.0.1"
        }
      ]
    },
    "Internal": false,
    "Attachable": false,
    "Ingress": false,
    "ConfigFrom": {
      "Network": ""
    },
    "ConfigOnly": false,
    "Containers": {
      "a831ff7d54fd3a471081c77d9acd87d3309a45725fa85a8561315ef28241a7c4": {
        "Name": "nervous_brown",
        "EndpointID": "a19d785714632d9682f6846dc1c47f18242a78aace0bb4ffb5a916e55cc18714",
        "MacAddress": "86:4c:f8:dc:d7:47",
        "IPv4Address": "172.18.0.2/16",
        "IPv6Address": ""
      }
    },
    "Options": {},
    "Labels": {}
  }
]
```

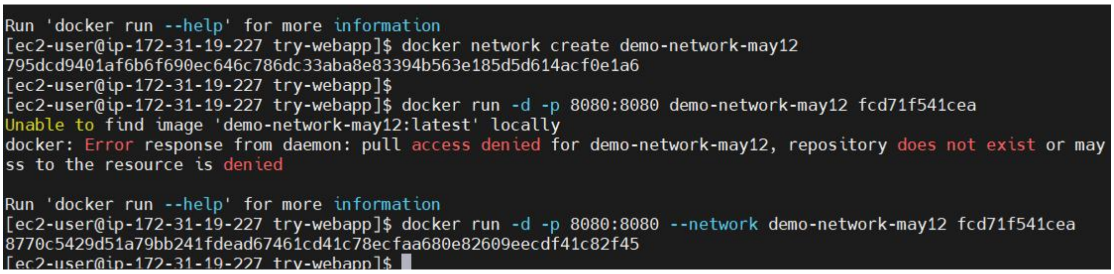
In this network we can see a container running

```
"Containers": {
      "a831ff7d54fd3a471081c77d9acd87d3309a45725fa85a8561315ef28241a7c4": {
        "Name": "nervous_brown",
        "EndpointID": "a19d785714632d9682f6846dc1c47f18242a78aace0bb4ffb5a916e55cc18714",
        "MacAddress": "86:4c:f8:dc:d7:47",
        "IPv4Address": "172.18.0.2/16",
        "IPv6Address": ""
      }
    },
```

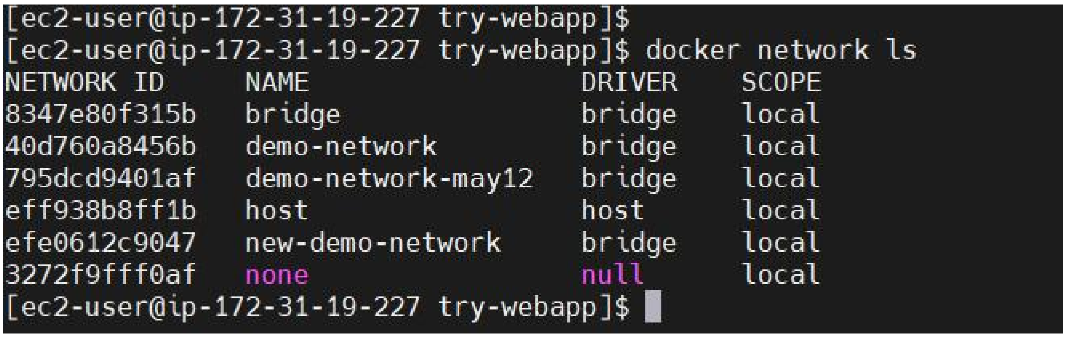


```
[ec2-user@ip-172-31-19-227 try-webapp]$
[ec2-user@ip-172-31-19-227 try-webapp]$ docker network inspect demo-network
[
    {
        "Name": "demo-network",
        "Id": "40d760a8456bfbaf84f613e10d14b393d1b88e32d8cdda5f93ed1f155f4c2c6d",
        "Created": "2025-05-11T21:53:17.844037279Z",
        "Scope": "local",
        "Driver": "bridge",
        "EnableIPv4": true,
        "EnableIPv6": false,
        "IPAM": {
            "Driver": "default",
            "Options": {},
            "Config": [
                {
                    "Subnet": "172.18.0.0/16",
                    "Gateway": "172.18.0.1"
                }
            ]
        },
        "Internal": false,
        "Attachable": false,
        "Ingress": false,
        "ConfigFrom": {
            "Network": ""
        },
        "ConfigOnly": false,
        "Containers": {
            "a831ff7d54fd3a471081c77d9acd87d3309a45725fa85a8561315ef28241a7c4": {
                "Name": "nervous_brown",
                "EndpointID": "a19d785714632d9682f6846dc1c47f18242a78aace0bb4ffb5a916e55cc18714",
                "MacAddress": "86:4c:f8:dc:d7:47",
                "IPv4Address": "172.18.0.2/16",
                "IPv6Address": ""
            }
        },
```

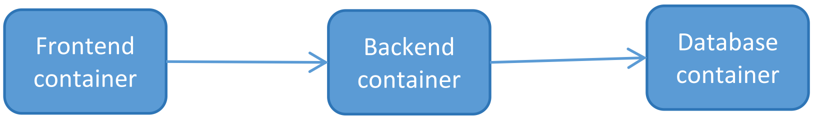
```
[ec2-user@ip-172-31-19-227 try-webapp]$ docker ps
CONTAINER ID   IMAGE         COMMAND             CREATED         STATUS         PORTS
NAMES
a831ff7d54fd   fcd71f541cea   "catalina.sh run"   2 minutes ago   Up 2 minutes   0.0.0.0:8080-
>8080/tcp, [::]:8080->8080/tcp   nervous_brown
[ec2-user@ip-172-31-19-227 try-webapp]$ docker stop a831ff7d54fd
a831ff7d54fd
[ec2-user@ip-172-31-19-227 try-webapp]$ docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
[ec2-user@ip-172-31-19-227 try-webapp]$

[ec2-user@ip-172-31-19-227 try-webapp]$ docker network ls
NETWORK ID     NAME               DRIVER    SCOPE
8347e80f315b   bridge             bridge    local
40d760a8456b   demo-network       bridge    local
eff938b8ff1b   host               host      local
efe0612c9047   new-demo-network   bridge    local
3272f9fff0af   none               null      local
```



```
Run 'docker run --help' for more information
[ec2-user@ip-172-31-19-227 try-webapp]$ docker network create demo-network-may12
795dcd9401af6b6f690ec646c786dc33aba8e83394b563e185d5d614acf0e1a6
[ec2-user@ip-172-31-19-227 try-webapp]$
[ec2-user@ip-172-31-19-227 try-webapp]$ docker run -d -p 8080:8080 demo-network-may12 fcd71f541cea
Unable to find image 'demo-network-may12:latest' locally
docker: Error response from daemon: pull access denied for demo-network-may12, repository does not exist or may
ss to the resource is denied

Run 'docker run --help' for more information
[ec2-user@ip-172-31-19-227 try-webapp]$ docker run -d -p 8080:8080 --network demo-network-may12 fcd71f541cea
8770c5429d51a79bb241fdead67461cd41c78ecfaa680e82609eecdf41c82f45
[ec2-user@ip-172-31-19-227 try-webapp]$
```



```
[ec2-user@ip-172-31-19-227 try-webapp]$
[ec2-user@ip-172-31-19-227 try-webapp]$ docker network ls
NETWORK ID     NAME                 DRIVER    SCOPE
8347e80f315b   bridge               bridge    local
40d760a8456b   demo-network         bridge    local
795dcd9401af   demo-network-may12   bridge    local
eff938b8ff1b   host                 host      local
efe0612c9047   new-demo-network     bridge    local
3272f9fff0af   none                 null      local
[ec2-user@ip-172-31-19-227 try-webapp]$
```



Microservices --> Multiple containers will be there
If you want to manage multiple containers then we need Docker-compose. When we have multiple containers, concept of docker-compose comes into picture

Docker-compose:
Docker-compose is a tool for running multiple container Docker applications.

Usually in a microservice application there will be multiple APIs and for every API we may have to create separate containers in that case. In that case, managing many containers would be difficult (create / start / stop containers), to overcome this problem we have Docker-compose. In Docker-compose using single command, we can create / start / stop multiple containers

It uses yaml file to configure the application services

docker-compose.yml is used to specify container information

Default and recommended name is docker-compose.yml (we can change it if required)

There will be 4 sections within docker-compose.yml file

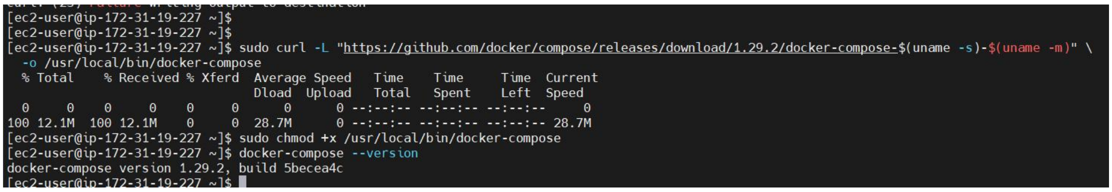
Sections: Version (represents compose yml version), Services (represents container information image-name, port-mapping, …) , Network (represents docker network to run our containers), Volumes (represents container storage location)

```
[ec2-user@ip-172-31-19-227 try-webapp]$ docker -v
Docker version 28.1.1, build 4eba377
```

```
[ec2-user@ip-172-31-19-227 try-webapp]$ docker-compose --version
-bash: docker-compose: command not found
```

https://docs.docker.com/compose/install/linux/

```
sudo curl -L "https://github.com/docker/compose/releases/download/1.29.2/docker-compose-$(uname -s)-$(uname -m)" \
 -o /usr/local/bin/docker-compose
sudo chmod +x /usr/local/bin/docker-compose
docker-compose --version
```



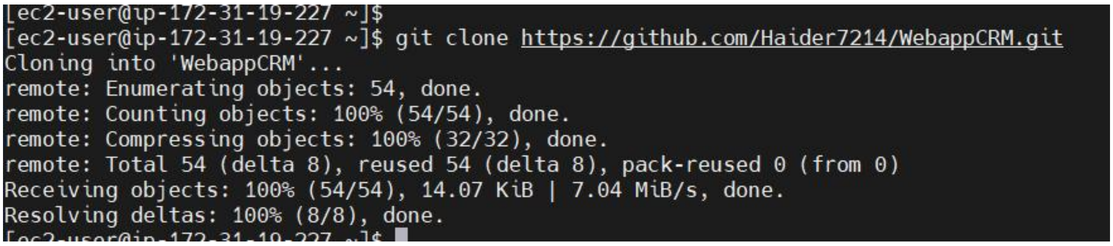
```
curl: (23) Failure writing output to destination
[ec2-user@ip-172-31-19-227 ~]$
[ec2-user@ip-172-31-19-227 ~]$
[ec2-user@ip-172-31-19-227 ~]$ sudo curl -L "https://github.com/docker/compose/releases/download/1.29.2/docker-compose-$(uname -s)-$(uname -m)" \
  -o /usr/local/bin/docker-compose
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
  0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--     0
100 12.1M  100 12.1M    0     0  28.7M      0 --:--:-- --:--:-- --:--:-- 28.7M
[ec2-user@ip-172-31-19-227 ~]$ sudo chmod +x /usr/local/bin/docker-compose
[ec2-user@ip-172-31-19-227 ~]$ docker-compose --version
docker-compose version 1.29.2, build 5becea4c
[ec2-user@ip-172-31-19-227 ~]$
```

Docker compose file

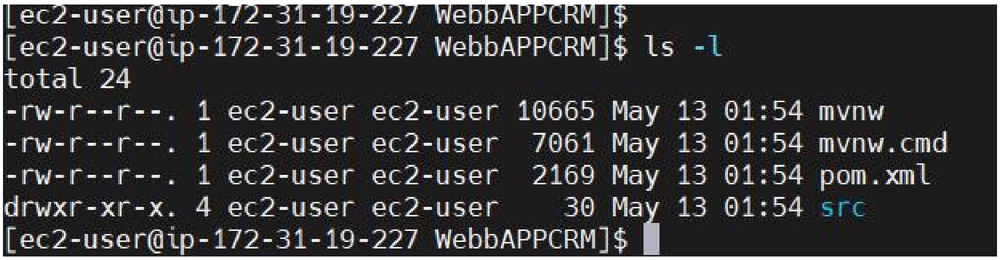
docker-compose.yml

```
version: “3”
services:
  application:
  image: springboot-app
  ports:
    - “8080:8080”
  networks:
    - compose-network
  depends_on:
   - mysqldb
  volumes:
   - /data/springboot-app
  mysqldb:
    image: mysql:8.3
    networks:
        - compose-network
    ports:
       - “3306:3306”
    environment:
        - MYSQL_ROOT_PASSWORD=root
        - MYSQL_DATABSE=sbms
    volumes:
        - /data/mysql
networks:
  compose-network:
```

```
[ec2-user@ip-172-31-19-227 ~]$ git clone https://github.com/Haider7214/WebappCRM.git
```



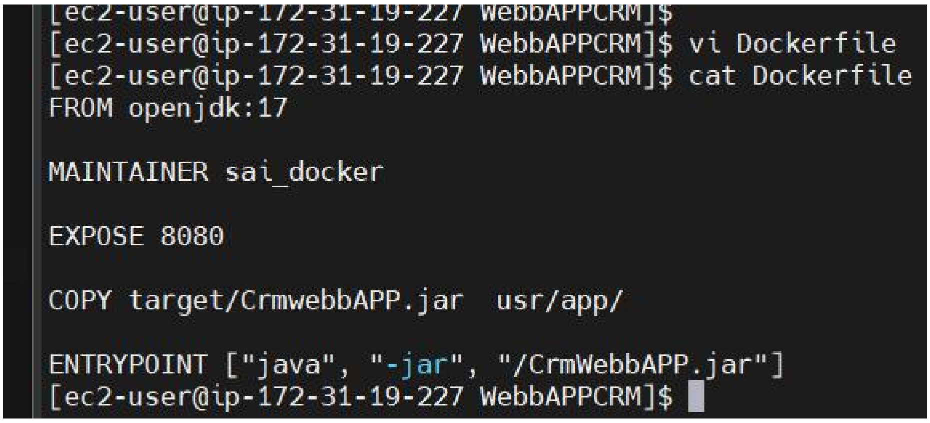
```
[ec2-user@ip-172-31-19-227 ~]$
[ec2-user@ip-172-31-19-227 ~]$ git clone https://github.com/Haider7214/WebappCRM.git
Cloning into 'WebappCRM'...
remote: Enumerating objects: 54, done.
remote: Counting objects: 100% (54/54), done.
remote: Compressing objects: 100% (32/32), done.
remote: Total 54 (delta 8), reused 54 (delta 8), pack-reused 0 (from 0)
Receiving objects: 100% (54/54), 14.07 KiB | 7.04 MiB/s, done.
Resolving deltas: 100% (8/8), done.
[ec2-user@ip-172-31-19-227 ~]$
```



```
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$ ls -l
total 24
-rw-r--r--. 1 ec2-user ec2-user 10665 May 13 01:54 mvnw
-rw-r--r--. 1 ec2-user ec2-user  7061 May 13 01:54 mvnw.cmd
-rw-r--r--. 1 ec2-user ec2-user  2169 May 13 01:54 pom.xml
drwxr-xr-x. 4 ec2-user ec2-user    30 May 13 01:54 src
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$
```

No dockerfile, docker-compose file nor target folder

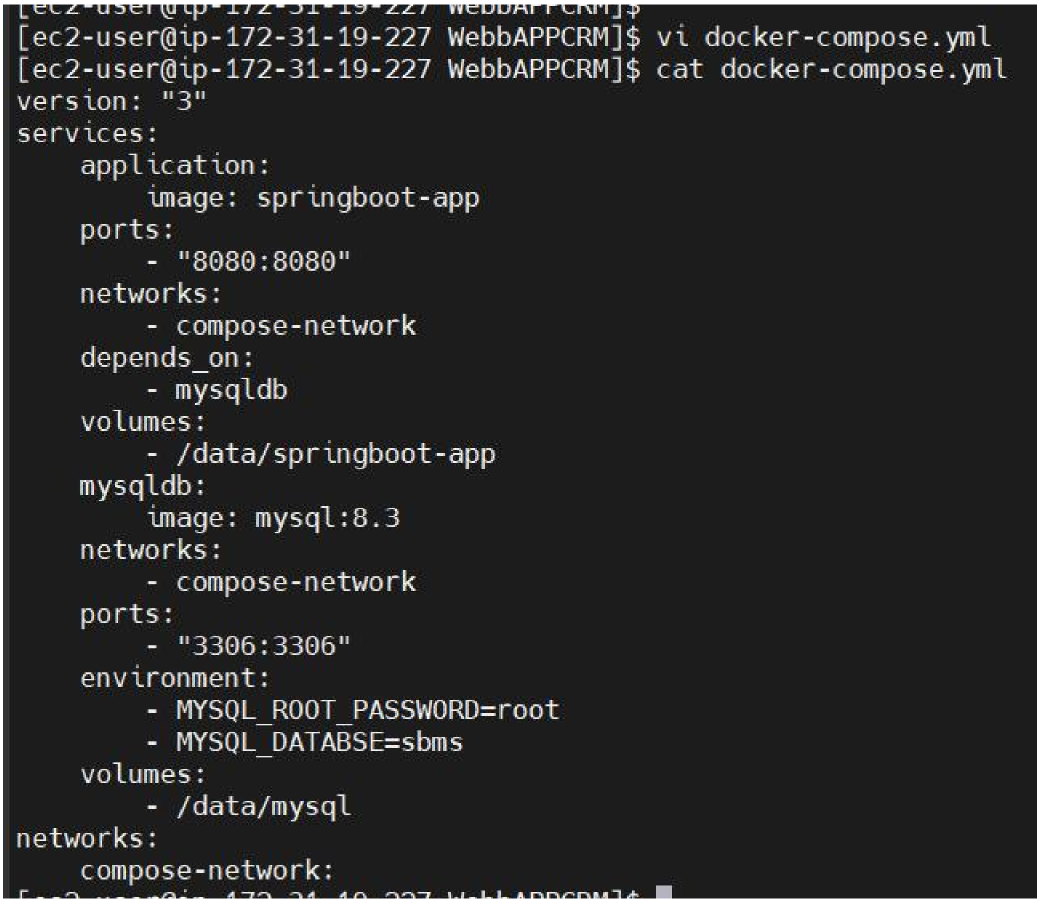
```
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$ mvn clean package

[ec2-user@ip-172-31-19-227 WebbAPPCRM]$ vi Dockerfile
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$ cat Dockerfile
FROM openjdk:17

MAINTAINER sai_docker

EXPOSE 8080

COPY target/CrmwebbAPP.jar  usr/app/

ENTRYPOINT ["java", "-jar", "/CrmWebbAPP.jar"]
```



```
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$ vi Dockerfile
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$ cat Dockerfile
FROM openjdk:17

MAINTAINER sai_docker

EXPOSE 8080

COPY target/CrmwebbAPP.jar  usr/app/

ENTRYPOINT ["java", "-jar", "/CrmWebbAPP.jar"]
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$
```

```
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$ vi docker-compose.yml
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$ cat docker-compose.yml
version: "3"
services:
  application:
    image: springboot-app
  ports:
    - "8080:8080"
  networks:
    - compose-network
  depends_on:
    - mysqldb
  volumes:
    - /data/springboot-app
  mysqldb:
    image: mysql:8.3
```

```
   networks:
      - compose-network
   ports:
      - "3306:3306"
   environment:
      - MYSQL_ROOT_PASSWORD=root
      - MYSQL_DATABSE=sbms
   volumes:
      - /data/mysql
networks:
   compose-network:
```



```
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$ vi docker-compose.yml
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$ cat docker-compose.yml
version: "3"
services:
    application:
        image: springboot-app
    ports:
        - "8080:8080"
    networks:
        - compose-network
    depends_on:
        - mysqldb
    volumes:
        - /data/springboot-app
    mysqldb:
        image: mysql:8.3
    networks:
        - compose-network
    ports:
        - "3306:3306"
    environment:
        - MYSQL_ROOT_PASSWORD=root
        - MYSQL_DATABSE=sbms
    volumes:
        - /data/mysql
networks:
    compose-network:
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$
```

```
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$ ls -l
total 32
-rw-r--r--. 1 ec2-user ec2-user   482 May 13 02:06 docker-compose.yml
-rw-r--r--. 1 ec2-user ec2-user   138 May 13 01:59 Dockerfile
-rw-r--r--. 1 ec2-user ec2-user 10665 May 13 01:54 mvnw
-rw-r--r--. 1 ec2-user ec2-user  7061 May 13 01:54 mvnw.cmd
-rw-r--r--. 1 ec2-user ec2-user  2169 May 13 01:54 pom.xml
drwxr-xr-x. 4 ec2-user ec2-user    30 May 13 01:54 src
drwxr-xr-x. 8 ec2-user ec2-user   140 May 13 01:56 target
```

```
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$ docker network create compose-network
```

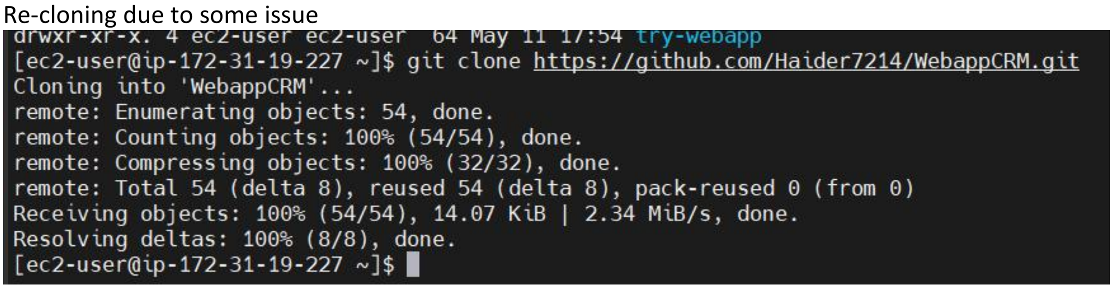
```
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$ mvn clean package
```

```
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$ cat Dockerfile
FROM openjdk:17

MAINTAINER sai_docker

EXPOSE 8080

COPY target/CrmWebbAPP.jar  usr/app/

ENTRYPOINT ["java", "-jar", "/CrmWebbAPP.jar"]
```

Updated docker-compose

```
[ec2-user@ip-172-31-19-227 WebbAPPCRM]$ cat docker-compose.yml
version: "3"
services:
  application:
    image: springboot-app
  ports:
    - "8080:8080"
  networks:
    - compose-network
  depends_on:
    - mysqldb
  volumes:
    - /data/springboot-app
  mysqldb:
    image: mysql:8.3
  networks:
    - compose-network
  ports:
    - "3306:3306"
  environment:
    - MYSQL_DATASOURCE_URL: jdbc:mysql://mysqldb:3306/sbms
    - MYSQL_ROOT_PASSWORD: root
    - MYSQL_DATABSE: sbms
  volumes:
    - /data/mysql
networks:
  compose-network:
```

Re-cloning due to some issue



```
drwxr-xr-x. 4 ec2-user ec2-user   64 May 11 17:54 try-webapp
[ec2-user@ip-172-31-19-227 ~]$ git clone https://github.com/Haider7214/WebappCRM.git
Cloning into 'WebappCRM'...
remote: Enumerating objects: 54, done.
remote: Counting objects: 100% (54/54), done.
remote: Compressing objects: 100% (32/32), done.
remote: Total 54 (delta 8), reused 54 (delta 8), pack-reused 0 (from 0)
Receiving objects: 100% (54/54), 14.07 KiB | 2.34 MiB/s, done.
Resolving deltas: 100% (8/8), done.
[ec2-user@ip-172-31-19-227 ~]$
```

Some problem in application will fix later

```
docker-compose up -d
docker-compose ps
docker-compose stop
docker-compose start
```