



**School of Computer Science, Engineering and Applications(SCSEA)**  
**B.Tech FIY (CCSA)**  
**Subject : Cloud Automation & Devops (P)**

**Name of the Student:** Pratik.M.Rebari      **PRN:** 20220802183

**Title of Practicle :** 3. Containerizing applications with Docker and Docker Compose

**1. Launch the instance.**

Name: Docker

AMI: Amazon Linux2023

Instance Type: t3.micro

Instance summary for i-Offcda7725e8e7203 (Docker) [Info](#)

Updated less than a minute ago

Instance ID	Public IPv4 address	Private IPv4 addresses
i-Offcda7725e8e7203	44.211.31.26   <a href="#">open address</a>	172.31.65.199
IPv6 address	Instance state	Public DNS
-	Running	ec2-44-211-31-26.compute-1.amazonaws.com   <a href="#">open address</a>
Hostname type	Private IP DNS name (IPv4 only)	Elastic IP addresses
IP name: ip-172-31-65-199.ec2.internal	ip-172-31-65-199.ec2.internal	-
Answer private resource DNS name	Instance type	AWS Compute Optimizer finding
IPv4 (A)	t3.micro	<a href="#">Opt-in to AWS Compute Optimizer for recommendations.</a>
Auto-assigned IP address	VPC ID	<a href="#">Learn more</a>
44.211.31.26 [Public IP]	vpc-0fc6827e18a8c0a7c	
IAM Role	Subnet ID	Auto Scaling Group name
-	subnet-0a48b65174f8469ce	-

**1. Install the Docker & Docker Compose.**

```
sudo yum update -y
```

```
sudo dnf install docker -y
```

```
sudo systemctl start docker
```

```
sudo systemctl enable docker
```

```
sudo usermod -aG docker ec2-user
```

```
sudo usermod -aG docker $USER
```

```
sudo curl -L
```

```
"https://github.com/docker/compose/releases/download/v2.29.2/docker-compose-linux-x86_64" -o /usr/local/bin/docker-compose
```



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```
sudo chmod +x /usr/local/bin/docker-compose
```

```
docker --version
```

```
docker compose version
```

```
docker-compose version
```

```
[ec2-user@ip-172-31-65-199 ~]$ sudo yum update -y
sudo dnf install docker -y
sudo systemctl start docker
sudo systemctl enable docker
sudo usermod -aG docker ec2-user
sudo curl -L "https://github.com/docker/compose/releases/download/v2.29.2/docker-compose-linux-x86_64" -o /usr/local/bin/docker-compose
sudo chmod +x /usr/local/bin/docker-compose
docker --version
docker compose version
docker-compose version|
```

```
Running scriptlet: container-selinux-4:2.242.0-1.amzn2023.noarch
Running scriptlet: docker-25.0.13-1.amzn2023.0.2.x86_64
Verifying   : container-selinux-4:2.242.0-1.amzn2023.noarch
Verifying   : containerd-2.1.4-1.amzn2023.0.2.x86_64
Verifying   : docker-25.0.13-1.amzn2023.0.2.x86_64
Verifying   : iptables-libs-1.8.8-3.amzn2023.0.2.x86_64
Verifying   : iptables-nft-1.8.8-3.amzn2023.0.2.x86_64
Verifying   : libcgroup-3.0-1.amzn2023.0.1.x86_64
Verifying   : libnetfilter_conntrack-1.0.8-2.amzn2023.0.2.x86_64
Verifying   : libnftnl-1.0.1-19.amzn2023.0.2.x86_64
Verifying   : libnftnl-1.2.2-2.amzn2023.0.2.x86_64
Verifying   : pigz-2.5-1.amzn2023.0.3.x86_64
Verifying   : runc-1.3.3-2.amzn2023.0.1.x86_64
                                                               11/11
                                                               11/11
                                                               1/11
                                                               2/11
                                                               3/11
                                                               4/11
                                                               5/11
                                                               6/11
                                                               7/11
                                                               8/11
                                                               9/11
                                                               10/11
                                                               11/11

Installed:
  container-selinux-4:2.242.0-1.amzn2023.noarch
  docker-25.0.13-1.amzn2023.0.2.x86_64
  iptables-nft-1.8.8-3.amzn2023.0.2.x86_64
  libnetfilter_conntrack-1.0.8-2.amzn2023.0.2.x86_64
  libnftnl-1.2.2-2.amzn2023.0.2.x86_64
  runc-1.3.3-2.amzn2023.0.1.x86_64
                                                               containerd-2.1.4-1.amzn2023.0.2.x86_64
                                                               iptables-libs-1.8.8-3.amzn2023.0.2.x86_64
                                                               libcgroup-3.0-1.amzn2023.0.1.x86_64
                                                               libnftnl-1.0.1-19.amzn2023.0.2.x86_64
                                                               pigz-2.5-1.amzn2023.0.3.x86_64
                                                               11/11
                                                               11/11
                                                               1/11
                                                               2/11
                                                               3/11
                                                               4/11
                                                               5/11
                                                               6/11
                                                               7/11
                                                               8/11
                                                               9/11
                                                               10/11
                                                               11/11

Complete!
Created symlink /etc/systemd/system/multi-user.target.wants/docker.service → /usr/lib/systemd/system/docker.service.
% Total    % Received % Xferd  Average Speed   Time   Time     Current
          Dload Upload Total Spent   Left Speed
0     0    0     0      0       0  0:--:--:--:--:--:--:--:-- 0
100 60.2M 100 60.2M    0      0  166M  0:--:--:--:--:--:--:--:-- 166M
Docker version 25.0.13, build 0bab007
docker: 'compose' is not a docker command.
See 'docker --help'
Docker Compose version v2.29.2
[ec2-user@ip-172-31-65-199 ~]$
```



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**Title of Practicle :** 3. Containerizing applications with Docker and Docker Compose

## 2. Create Your Project Folder

```
mkdir myapp
```

```
cd myapp
```

```
[ec2-user@ip-172-31-65-199 ~]$ mkdir myapp
[ec2-user@ip-172-31-65-199 ~]$ ls
myapp
[ec2-user@ip-172-31-65-199 ~]$ cd myapp/
[ec2-user@ip-172-31-65-199 myapp]$
```

## 3. Add Your Application Code

Example: Node.js Express app

Create app.js

```
$ vi app.js
```

```
const express = require("express");
```

```
const app = express();
```

```
app.get("/", (req, res) => res.send("Hello from Docker!"));
```

```
app.listen(3000, () => console.log("Server running on port 3000"));
```



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```
ec2-user@ip-172-31-65-199:~ % + v
const express = require("express");
const app = express();

app.get("/", (req, res) => res.send("Hello from Docker!"));

app.listen(3000, "0.0.0.0", () => {
  console.log("Server running on port 3000");
});
```

Create package.json

\$ **package.json**

```
{
  "name": "docker-app",
  "version": "1.0.0",
  "dependencies": {
    "express": "^4.17.1"
  }
}
```

```
ec2-user@ip-172-31-65-199:~ % + v
{
  "name": "docker-app",
  "version": "1.0.0",
  "dependencies": {
    "express": "^4.17.1"
  }
}
```



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#### **4. Write the Dockerfile**

Create Dockerfile

```
$ vi dockerfile
```

```
FROM node:18
```

```
WORKDIR /app
```

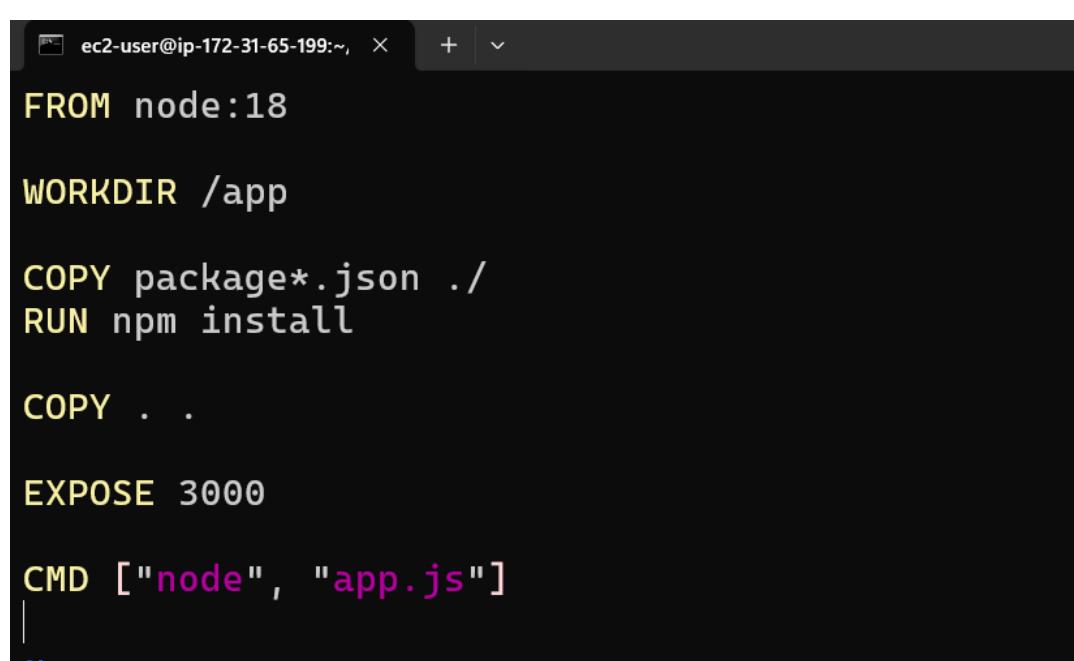
```
COPY package*.json ./
```

```
RUN npm install
```

```
COPY ..
```

```
EXPOSE 3000
```

```
CMD ["node", "app.js"]
```

A screenshot of a terminal window titled 'ec2-user@ip-172-31-65-199:~'. The window contains a Dockerfile with the following content:

```
FROM node:18

WORKDIR /app

COPY package*.json ./
RUN npm install

COPY .. .

EXPOSE 3000

CMD ["node", "app.js"]
```

The terminal prompt shows a cursor at the bottom.



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## 5. Build Docker Image

\$ docker build -t myapp .

```
[ec2-user@ip-172-31-65-199: ~] $ docker build -t myapp .
[+] Building 26.8s (10/10) FINISHED
  => [internal] load build definition from dockerfile
  => => transferring dockerfile: 210B
  => [internal] load metadata for docker.io/library/node:18
  => [internal] load .dockerignore
  => => transferring context: 2B
  => [1/5] FROM docker.io/library/node:18@sha256:c6ae79e38498325db67193d391e6ec1d224d96c693a8a4d9434985
     docker:default
     0.0s
  => => resolve docker.io/library/node:18@sha256:c6ae79e38498325db67193d391e6ec1d224d96c693a8a4d94349855
     0.0s
  => sha256:eb29363371ee2859fada6a3c5af88d4abc6ff7d399addb13b7de3c1f11bdee6b9 2.49kB / 2.49kB
     0.4s
  => sha256:37927ed901b1b2608b72796c6881bf645480268eca4ac9a37b9219e050bb4d84 24.02MB / 24.02MB
     0.8s
  => => sha256:c6ae79e38498325db67193d391e6ec1d224d96c693a8a4d9434985 19.9s
  => => sha256:b50082bc3670d0396b2d90e4b0e5bb10265ba5d0ee16bf40f9a505f7045ee563 6.39kB / 6.39kB
     0.0s
  => => sha256:3e6b9d1a95114e19f12262a4e8a59ad1d1a18ca7b82108adcf0605a200294964 48.49MB / 48.49MB
     0.9s
  => => sha256:79b2f47ad4443652b9b5cc81a95ede249fd976310efdbbee159f29638783778c0 64.40MB / 64.40MB
     1.0s
  => => extracting sha256:3e6b9d1a95114e19f12262a4e8a59ad1d1a10ca7b82108adcf0605a200294964
     3.2s
  => => sha256:e23f099911d692f62b851cf49a1e93294288a115f5cd2d014180e4d3684d34ab 211.36MB / 211.36MB
     4.2s
  => => sha256:cda7f44f2bddcc4bb7514474024b3f3705de09ddb6355a33be5ac7808e5b7125 3.32kB / 3.32kB
     1.0s
  => => sha256:c6b30c3f16966552af18ac00521f60355b1fcfd46ac1c20b1038587e28583ce7 45.68MB / 45.68MB
     1.6s
  => => sha256:3697be50c98b9d071df4637e1d3491d00e7b9f3a732768c876d82309b3c5a145 1.25MB / 1.25MB
     1.1s
  => => sha256:461077a72fb7fe40d34a37d6a1958c4d16772d0dd7f572ec50a1fdc41a3754d 406B / 446B
     1.2s
  => => extracting sha256:37927ed901b1b2608b72796c6881bf645480268eca4ac9a37b9219e050bb4d84
     0.7s
  => => extracting sha256:79b2f47ad4443652b9b5cc81a95ede249fd976310efdbbee159f29638783778c0
     3.1s
  => => extracting sha256:e23f099911d692f62b851cf49a1e93294288a115f5cd2d014180e4d3684d34ab
     8.5s
  => => extracting sha256:cda7f44f2bddcc4bb7514474024b3f3705de09ddb6355a33be5ac7808e5b7125
     0.0s
  => => sha256:c6b30c3f16966552af18ac00521f60355b1fcfd46ac1c20b1038587e28583ce7
     2.5s
  => => extracting sha256:3697be50c98b9d071df4637e1d3491d00e7b9f3a732768c876d82309b3c5a145
     0.0s
  => => extracting sha256:461077a72fb7fe40d34a37d6a1958c4d16772d0dd7f572ec50a1fdc41a3754d
     0.0s
  => [internal] load build context
     0.0s
```

**Check image:**

\$ docker images

```
[ec2-user@ip-172-31-65-199: ~] $ docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
myapp          latest   11ddef4c9302  45 seconds ago  1.1GB
[ec2-user@ip-172-31-65-199 myapp]$ |
```



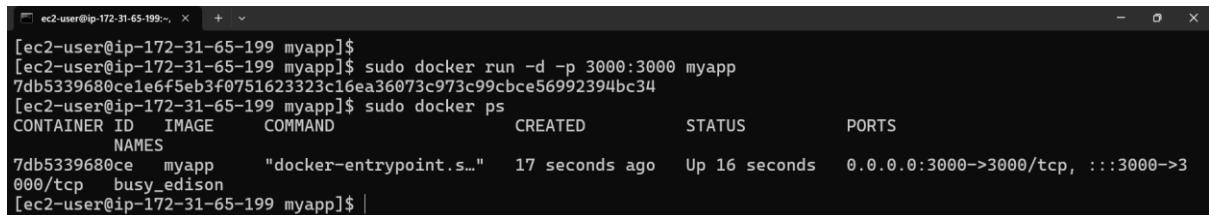
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## 6. Run Container (Without Compose)

```
$ docker run -d -p 3000:3000 --name myapp_container myapp
```



```
[ec2-user@ip-172-31-65-199 ~]$ [ec2-user@ip-172-31-65-199 myapp]$ sudo docker run -d -p 3000:3000 myapp 7db5339680ce1e6f5eb3f0751623323c16ea36073c973c99cbce56992394bc34 [ec2-user@ip-172-31-65-199 myapp]$ sudo docker ps CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES 7db5339680ce myapp "docker-entrypoint.s..." 17 seconds ago Up 16 seconds 0.0.0.0:3000->3000/tcp, :::3000->3000/tcp busy_edison [ec2-user@ip-172-31-65-199 myapp]$ |
```

Test:

```
http://<ip>:3000
```



## 7. Create docker-compose.yml

```
$ docker-compose.yml
version: "3.8"
services:
  web:
    build: .
    container_name: myapp_container
    ports:
      - "3000:3000"
    restart: unless-stopped
```



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```
ec2-user@ip-172-31-65-199:~ % + ~
version: "3.8"

services:
  web:
    build: .
    container_name: myapp_container
    ports:
      - "3000:3000"
    restart: unless-stopped
| ~
```

## 8. Run Using Docker Compose

**Start:**

```
$ docker-compose up -d
```

```
[ec2-user@ip-172-31-65-199 myapp]$ docker-compose up -d
WARN[0000] /home/ec2-user/myapp/docker-compose.yml: the attribute 'version' is obsolete, it will be ignored, please remove it to avoid potential confusion
[+] Running 1/1
  ✓ Container myapp_container  Started
0.4s
[ec2-user@ip-172-31-65-199 myapp]$ |
```

**Check running:**

```
$ docker ps
```

```
[ec2-user@ip-172-31-65-199 myapp]$ docker ps
CONTAINER ID   IMAGE          COMMAND       CREATED        STATUS        PORTS
 NAMES
ca119894f1c0   myapp-web    "docker-entrypoint.s..."  38 seconds ago  Up 37 seconds  3000/tcp, 0.0.0.0:8080->8080/tcp
' :::8080->8080/tcp   myapp_container
7db5339680ce   myapp        "docker-entrypoint.s..."  19 minutes ago  Up 19 minutes  0.0.0.0:3000->3000/tcp, :::3000->3000/tcp
busy_edison
[ec2-user@ip-172-31-65-199 myapp]$ |
```