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DevOps Engineer Challenge

Please follow the instructions mentioned below to complete the challenge. The challenge has to be completed by tomorrow end of the day at the latest.

Ensure that you document (PDF) the commands that you have used to carry out the steps (including screenshots) and send the document along with the challenge completion confirmation.

Please launch an AWS instance and perform the following task

Part 1: Create a sudo user in Ubuntu

1. Log in to Linux and create a new user called “DevOps”

```
ubuntu@ip-172-31-16-111:~$ sudo useradd DevOps
ubuntu@ip-172-31-16-111:~$ id DevOps
uid=1001(DevOps) gid=1001(DevOps) groups=1001(DevOps)
ubuntu@ip-172-31-16-111:~$ █
```

2. Add a DevOps user to the sudo group

```
# User privilege specification
root    ALL=(ALL:ALL) ALL
DevOps  ALL=(ALL:ALL) ALL
```

Part 2: Checkout, Build, and Deploy a React Project

1. Install NodeJS & npm, package manager

```
$ sudo apt install nodejs
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
```

```
No VM guests are running.
$ node --version
v18.20.8
$ npm --version
10.8.2
```

2. Clone/checkout project from the below URL
(<https://github.com/riyanuddin17/DevOpsChallenge.git>) into "/opt/checkout/chat-app"

```
$ pwd
/opt/checkout
$ sudo git clone https://github.com/riyanuddin17/DevOps-Challenge.git
Cloning into 'DevOps-Challenge'...
remote: Enumerating objects: 66, done.
remote: Counting objects: 100% (29/29), done.
remote: Compressing objects: 100% (22/22), done.
remote: Total 66 (delta 14), reused 7 (delta 7), pack-reused 37 (from 1)
Receiving objects: 100% (66/66), 104.56 KiB | 20.91 MiB/s, done.
Resolving deltas: 100% (18/18), done.
$ ls
DevOps-Challenge
$ cd DevOps-Challenge
$ ls
Acornfile README.md index.html package-lock.json package.json public src vite.config.js yarn.lock
$ █
```

- 3 Build the react project by running the “npm install” and then the “npm run build” command to generate the “dist” folder

```
$ pwd
/opt/checkout/DevOps-Challenge
$ sudo npm install

added 283 packages, and audited 284 packages in 4s

98 packages are looking for funding
  run `npm fund` for details

9 vulnerabilities (1 low, 5 moderate, 3 high)

To address all issues, run:
  npm audit fix

Run `npm audit` for details.
npm notice
npm notice New major version of npm available! 10.8.2 -> 11.6.4
npm notice Changelog: https://github.com/npm/cli/releases/tag/v11.6.4
npm notice To update run: npm install -g npm@11.6.4
npm notice
$ █
```

```
$ sudo npm run build

> i18n-tutorial@0.0.0 build
> vite build

vite v5.0.10 building for production...
✓ 67 modules transformed.
dist/index.html          0.48 kB | gzip: 0.31 kB
dist/assets/index-xzd4obSc.css 0.59 kB | gzip: 0.34 kB
dist/assets/index-vNmJavtl.js 230.53 kB | gzip: 72.33 kB
✓ built in 848ms
$ █
```

4. Move generated dist files ("dist" folder) to "/opt/deployment/react"

```
$ pwd
/opt/checkout/DevOps-Challenge
$ sudo cp -r /opt/checkout/DevOps-Challenge/dist/* /opt/deployment/react/
$ sudo ls -la /opt/deployment/react/
total 24
drwxr-xr-x 4 DevOps DevOps 4096 Nov 27 08:47 .
drwxr-xr-x 3 DevOps DevOps 4096 Nov 27 08:24 ..
drwxr-xr-x 2 root    root   4096 Nov 27 08:47 assets
-rw-r--r-- 1 root    root   479 Nov 27 08:47 index.html
drwxr-xr-x 6 root    root   4096 Nov 27 08:47 locales
-rw-r--r-- 1 root    root  1497 Nov 27 08:47 vite.svg
$ █
```

5. Deploy the project using the pm2 process

```
$ pwd
/opt/deployment/react
$ sudo npm install -g pm2

added 133 packages in 6s
```

id	name	mode	ø	status	cpu	memory
0	DevOps-Challenge	fork	0	online	0%	33.6mb

```
$ sudo pm2 save
[PM2] Saving current process list...
[PM2] Successfully saved in /root/.pm2/dump.pm2
$ sudo pm2 startup systemd
[PM2] Init System found: systemd
Platform systemd
```

Part 3: Serve the Project

1. Setup Nginx proxy and proxy all requests to react project

```
$ sudo apt install nginx
Reading package lists... Done
Building dependency tree... Done
```

```
$ sudo systemctl start nginx
$ sudo systemctl enable nginx
Synchronizing state of nginx.service with sysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable nginx
$ sudo systemctl status nginx
● nginx.service - A high performance web server and a reverse proxy server
   Loaded: loaded (/usr/lib/systemd/system/nginx.service; enabled; preset: enabled)
   Active: active (running) since Thu 2025-11-27 09:06:08 UTC; 1min 55s ago
     Docs: man:nginx(8)
     Main PID: 3837 (nginx)
        Tasks: 3 (limit: 9283)
       Memory: 2.4M (peak: 5.1M)
          CPU: 15ms
        CGrou.../system.slice/nginx.service
           ├─3837 "nginx: master process /usr/sbin/nginx -g daemon on; master_process"
           ├─3839 "nginx: worker process"
           └─3840 "nginx: worker process"

Nov 27 09:06:08 ip-172-31-16-111 systemd[1]: Starting nginx.service - A high performance web server and a reverse proxy server...
Nov 27 09:06:08 ip-172-31-16-111 systemd[1]: Started nginx.service - A high performance web server and a reverse proxy server...
lines 1-15/15 (END)
```

2. Access `HTTP:<IP_address>` from the browser it should display the chat app



3. Ensure all ports except 80 (HTTP), 443 (HTTPS), 3000 (custom port for docker container) and 22 (SSH) are blocked using UFW

```
113.  
$ sudo apt install ufw  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
ufw is already the newest version (0.36.2-6).  
ufw set to manually installed.  
0 upgraded, 0 newly installed, 0 to remove and 27 not upgraded.  
$ sudo ufw default deny incoming  
Default incoming policy changed to 'deny'  
(be sure to update your rules accordingly)  
$ sudo ufw default allow outgoing  
Default outgoing policy changed to 'allow'  
(be sure to update your rules accordingly)  
$ sudo ufw allow 22/tcp  
Rules updated  
Rules updated (v6)  
$ sudo ufw allow 80/tcp  
Rules updated  
Rules updated (v6)  
$ sudo ufw allow 443/tcp  
Rules updated  
Rules updated (v6)  
$ sudo ufw allow 3000/tcp  
Rules updated
```

Part 4: CICD

1. Setup/install Jenkins, Access [HTTP:</<IP_ADDRESS>:8080](http://<IP_ADDRESS>:8080) Jenkins and setup admin password

```
ubuntu@ip-172-31-16-111:~$ java -v  
Unrecognized option: -v  
Error: Could not create the Java Virtual Machine.  
Error: A fatal exception has occurred. Program will exit.  
ubuntu@ip-172-31-16-111:~$ java --version  
openjdk 11.0.29 2025-10-21  
OpenJDK Runtime Environment (build 11.0.29+7-post-Ubuntu-1ubuntu124.04)  
OpenJDK 64-Bit Server VM (build 11.0.29+7-post-Ubuntu-1ubuntu124.04, mixed mode,  
sharing)  
ubuntu@ip-172-31-16-111:~$ █
```

```
ubuntu@ip-172-31-16-111:~$ sudo systemctl start jenkins  
ubuntu@ip-172-31-16-111:~$ sudo systemctl enable jenkins  
Synchronizing state of jenkins.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.  
Executing: /usr/lib/systemd/systemd-sysv-install enable jenkins  
ubuntu@ip-172-31-16-111:~$ sudo systemctl status jenkins  
● jenkins.service - Jenkins Continuous Integration Server  
   Loaded: loaded (/usr/lib/systemd/system/jenkins.service; enabled; preset: en  
     Active: active (running) since Thu 2025-11-27 10:00:40 UTC; 1min 52s ago  
       Main PID: 10044 (java)  
          Tasks: 43 (limit: 9283)  
         Memory: 677.5M (peak: 684.2M)  
            CPU: 12.438s  
          CGroup: /system.slice/jenkins.service  
              └─ 10044 /usr/bin/java -Djava.awt.headless=true -jar /var/lib/jenkins/jen
```

Getting Started

Unlock Jenkins

To ensure Jenkins is securely set up by the administrator, a password has been written to the log ([not sure where to find it?](#)) and this file on the server:

`/var/lib/jenkins/secrets/initialAdminPassword`

Please copy the password from either location and paste it below.

Administrator password

Continue

Getting Started

Jenkins is ready!

Your Jenkins setup is complete.

Start using Jenkins

2. Create a Jenkins Pipeline job to a) stop running deployment; b) pull fresh code from git to "/opt/checkout/chat-app"; c) dist to "/opt/deployment/react" ; d) deploy using pm2

3. Select and install a Jenkins plugin to upload files to s3

Updates

Available plugins

Installed plugins

Search installed plugins

Name ↓	Health	Enabled
Amazon Web Services SDK 2 :: Core 2.33.4-62.vc1a_8df64b_4c9 Core modules for the AWS SDK for Java. Report an issue with this plugin	100	
Amazon Web Services SDK 2 :: EC2 2.33.4-62.vc1a_8df64b_4c9 EC2 module for the AWS SDK for Java. Report an issue with this plugin	100	
Amazon Web Services SDK 2 :: S3 2.33.4-62.vc1a_8df64b_4c9 S3 module for the AWS SDK for Java. Report an issue with this plugin	100	

4. Update the Jenkins pipeline job - add step e) upload dist to s3 using the share s3 credentials definition

Pipeline script from SCM

SCM ?

Git

Repositories ?

Repository URL ?

`https://github.com/riyanuddin17/DevOps-Challenge.git`

Credentials ?

- none -

Advanced ▾

```

# User privilege specification
root    ALL=(ALL:ALL) ALL
DevOps  ALL=(ALL:ALL) ALL
# Members of the admin group may gain root privileges
%admin  ALL=(ALL) ALL
DevOps  ALL=(ALL:ALL) ALL
# Allow members of group sudo to execute any command
%sudo   ALL=(ALL:ALL) ALL

# See sudoers(5) for more information on "@include" directives:

@include /etc/sudoers.d
jenkins ALL=(ALL) NOPASSWD: /usr/bin/pm2, /usr/bin/git, /usr/bin/npm

```

The screenshot shows a Jenkins job named "chat-app-pipeline" running on a Jenkins instance at 13.233.179.219.08080. The console output window displays the following Jenkinsfile code:

```

pm2 start app.js --name chat-app
pm2 status

```

Below the code, the Jenkins log output shows the execution of the commands:

```

+ pm2 status
[{"id": 1, "name": "36000@39m", "namespace": "chat-app", "version": "22m", "mode": "default", "pid": "N/A", "uptime": "7m", "d": "1m", "status": "forked", "cpu": "13012", "mem": "0s", "user": "0", "watching": "0"}, {"id": 2, "name": "1monline@22m", "namespace": "chat-app", "version": "39m", "mode": "idle", "pid": "68.7mb", "uptime": "90ms", "d": "90ms", "status": "disabled", "cpu": "0", "mem": "0", "user": "0", "watching": "0"}]
[Pipeline]
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Declarative: Post Actions)
[Pipeline] echo
Pipeline completed successfully
[Pipeline]
[Pipeline] // stage
[Pipeline] stage
[Pipeline] {
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS

```

The Jenkins interface also shows the REST API endpoint and the Jenkins version (2.528.2) at the bottom.

Part 5: Docker

- Dockerize the react app (image should contain only dist files) and expose on port 3000, use docker-compose to manage the bring the docker container up (E.g: docker-compose up to start container)

```
ubuntu@ip-172-31-45-11:/opt/checkout/chat-app$ sudo apt install -y ca-certificates curl gnupg lsb-release
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
lsb-release is already the newest version (11.1.0ubuntu4).
lsb-release set to manually installed.
ca-certificates is already the newest version (20240203~22.04.1).
curl is already the newest version (7.81.0-1ubuntu1.21).
gnupg is already the newest version (2.2.27-3ubuntu2.4).
The following packages were automatically installed and are no longer required:
  openjdk-11-jdk-headless openjdk-11-jre
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 27 not upgraded.
ubuntu@ip-172-31-45-11:/opt/checkout/chat-app$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | \
  sudo gpg --dearmor -o /usr/share/keyrings/docker-archive-keyring.gpg
ubuntu@ip-172-31-45-11:/opt/checkout/chat-app$ echo \
  "deb [arch=$(dpkg --print-architecture) signed-by=/usr/share/keyrings/docker-archive-keyring.gpg] \
  https://download.docker.com/linux/ubuntu \
  $(lsb_release -cs) stable" | \
  sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
ubuntu@ip-172-31-45-11:/opt/checkout/chat-app$ sudo apt update
```

```
FROM nginx:alpine

# Remove default config
RUN rm /etc/nginx/conf.d/default.conf

# Copy custom nginx config
COPY nginx.conf /etc/nginx/conf.d/default.conf

# Copy built files only (dist)
COPY dist/ /usr/share/nginx/html/

EXPOSE 3000

CMD ["nginx", "-g", "daemon off;"]
```

```

server {
    listen 3000;
    server_name _;

    root /usr/share/nginx/html;
    index index.html index.htm;

    location / {
        try_files $uri /index.html;
    }
}

```

```

ubuntu@ip-172-31-45-11:/opt/checkout/chat-app$ sudo docker build -t chat-app:latest .
[+] Building 5.9s (9/9) FINISHED
   => [internal] load build definition from Dockerfile
   => => transferring dockerfile: 310B
   => [internal] load metadata for docker.io/library/nginx:alpine
   => [internal] load .dockerignore
   => => transferring context: 52B
   => [1/4] FROM docker.io/library/nginx:alpine@sha256:b3c656d55d7ad751196f2 2.4s
   => => resolve docker.io/library/nginx:alpine@sha256:b3c656d55d7ad751196f2 0.0s

```

IMAGE	ID	DISK USAGE	CONTENT SIZE	EXTRA
chat-app:latest	bf195dd3763f	80.2MB	22.7MB	

```

GNU nano 6.2                               docker-compose.yml *
version: '3.8'

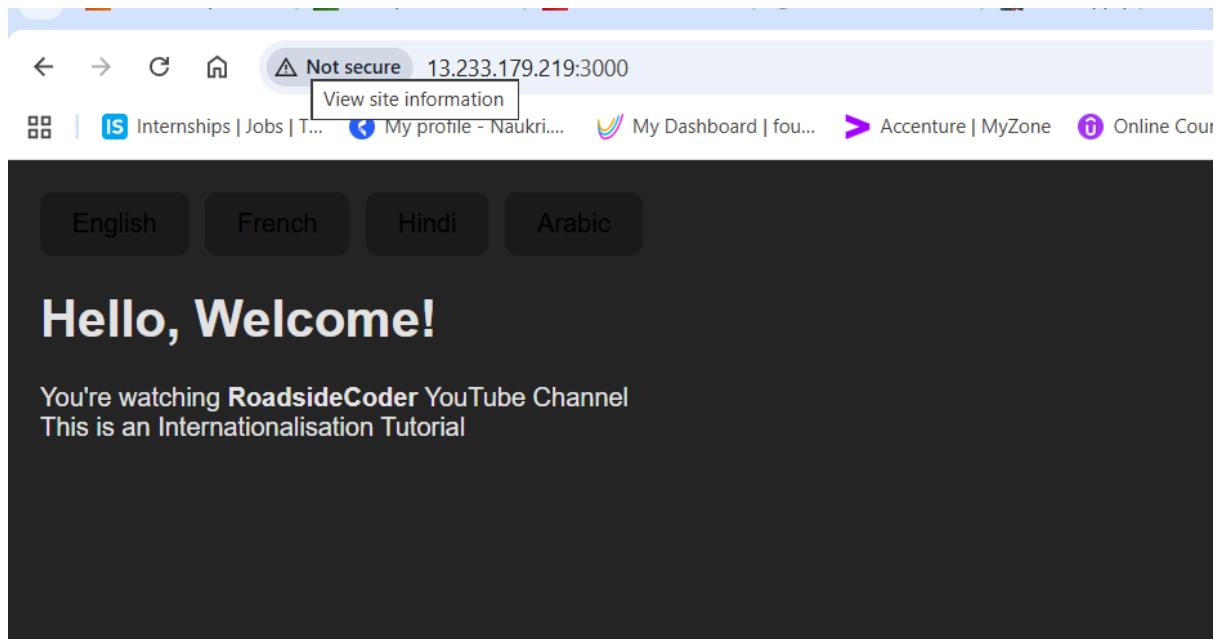
services:
  chat-app:
    image: chat-app:latest
    container_name: chat-app-container
    ports:
      - "3000:3000"
    restart: always

```

```

ubuntu@ip-172-31-45-11:/opt/checkout/chat-app$ sudo docker-compose up -d
WARN[0000] /opt/checkout/chat-app/docker-compose.yml: the attribute `version` is
obsolete, it will be ignored, please remove it to avoid potential confusion
[+] Running 2/2
  ✓ Network chat-app_default      Created          0.0s
  ✓ Container chat-app-container Started        0.3s
ubuntu@ip-172-31-45-11:/opt/checkout/chat-app$ sudo docker ps
CONTAINER ID   IMAGE           COMMAND          CREATED          STATUS          NAMES
          Ports
41cec8ff14d4   chat-app:latest   "/docker-entrypoint...."   15 seconds ago   Up 15
seconds   80/tcp, 0.0.0.0:3000->3000/tcp, [::]:3000->3000/tcp   chat-app-containe
r
ubuntu@ip-172-31-45-11:/opt/checkout/chat-app$ 

```



EBS Scalable Storage in the Cloud

Instances (1/1) Info

Last updated about 2 hours ago

Connect Instance state Actions Launch instances

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...
DevOps-Chall...	i-0c8d775cac24daa9a	Running	c7i-flex.large	3/3 checks passed	View alarms +	ap-south-1a	ec2-13-233-179-219.ap...	13.233.179.219

Project Challenge Completed