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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 r
$ 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  v
ite.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	🔄	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
```

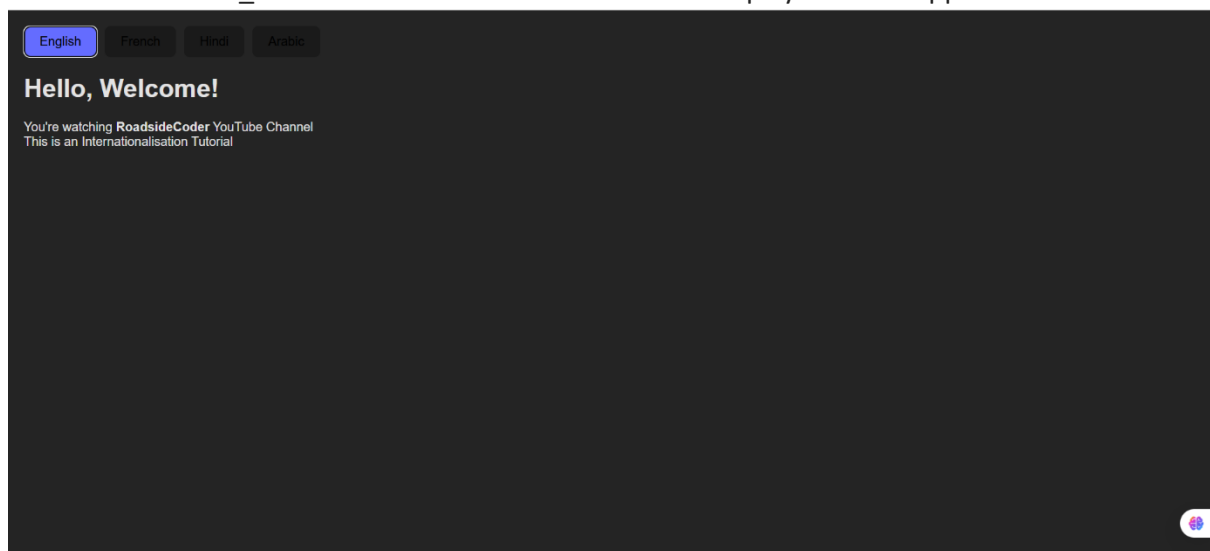
```

$ 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
   CGroup: /system.slice/nginx.service
           └─3837 "nginx: master process /usr/sbin/nginx -g daemon on; master_
              └─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 per
Nov 27 09:06:08 ip-172-31-16-111 systemd[1]: Started nginx.service - A high perf
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

```

$ 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 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/sys
temd/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: ena
   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

```

## 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.		
--	--	--

<a href="#">Report an issue with this plugin</a>		
--	--	--

100		
-----	--	--



Amazon Web Services SDK 2 :: EC2 2.33.4-62.vc1a_8df64b_4c9		
--	--	--

EC2 module for the AWS SDK for Java.		
--------------------------------------	--	--

<a href="#">Report an issue with this plugin</a>		
--	--	--

100		
-----	--	--



Amazon Web Services SDK 2 :: S3 2.33.4-62.vc1a_8df64b_4c9		
---	--	--

S3 module for the AWS SDK for Java.		
-------------------------------------	--	--

<a href="#">Report an issue with this plugin</a>		
--	--	--

100		
-----	--	--



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

Pipeline script from SCM

SCM ?

Git

Repositories ?

Repository URL ?

<https://github.com/riyanuddin17/DevOps-Challenge.git>

Credentials ?

- none -

+ Add

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:

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

The screenshot shows a Jenkins console output for a pipeline named 'chat-app-pipeline'. The output displays the status of a container named 'pm2' and the execution of a pipeline. The container status table is as follows:

id	name	namespace	version	mode	pid	uptime	U	status	cpu	mem	user	watching
1	chat-app	chat-app	default	N/A	1	1m	1m	Running	0%	0%	root	

The pipeline execution logs show the following steps:

```
[Pipeline]
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (Declarative: Post Actions)
[Pipeline] echo
Pipeline completed successfully
[Pipeline]
[Pipeline] // stage
[Pipeline]
[Pipeline] // withEnv
[Pipeline]
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

## Part 5: Docker

1. 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 \
  $(lsb_release -cs) stable" | \
  > ^C
ubuntu@ip-172-31-45-11:/opt/checkout/chat-app$
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                                docker:default
=> [internal] load build definition from Dockerfile              0.1s
=> => transferring dockerfile: 310B                             0.0s
=> [internal] load metadata for docker.io/library/nginx:alpine  2.5s
=> [internal] load .dockerignore                                0.0s
=> => transferring context: 52B                                  0.0s
=> [1/4] FROM docker.io/library/nginx:alpine@sha256:b3c656d55d7ad751196f2 2.4s
=> => resolve docker.io/library/nginx:alpine@sha256:b3c656d55d7ad751196f2 0.0s
```

```
ubuntu@ip-172-31-45-11:/opt/checkout/chat-app$ sudo docker images
```

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

```
ubuntu@ip-172-31-45-11:/opt/checkout/chat-app$
```

```
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
```

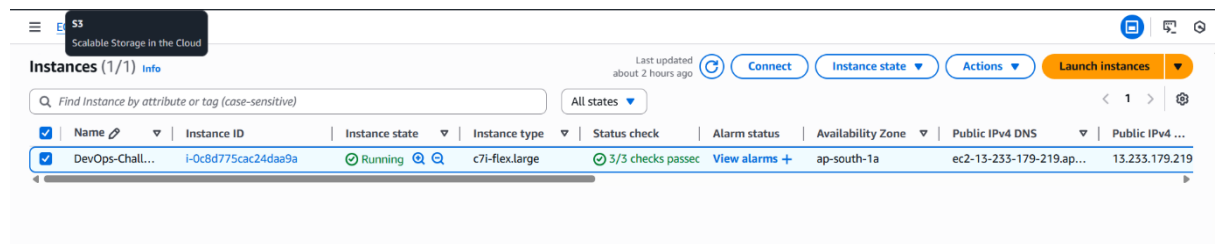
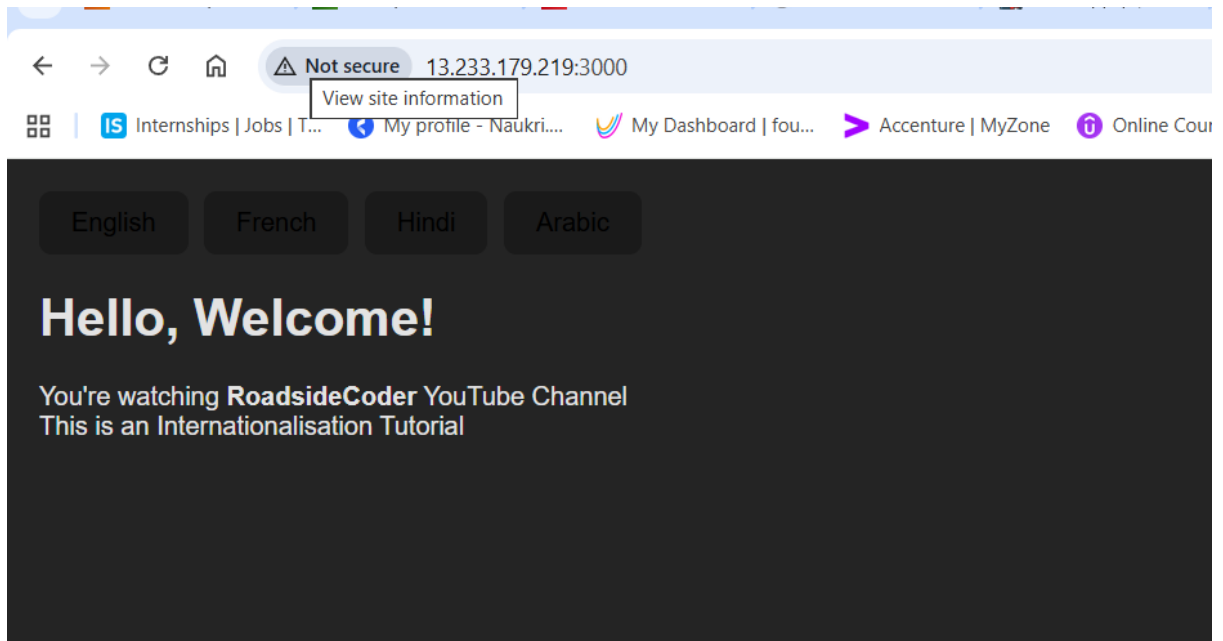
```
✓ Network chat-app_default Created 0.0s
```

```
✓ 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
41cec8ff14d4	chat-app:latest	"/docker-entrypoint..."	15 seconds ago	Up 15 seconds

```
ubuntu@ip-172-31-45-11:/opt/checkout/chat-app$
```



Project Challenge Completed