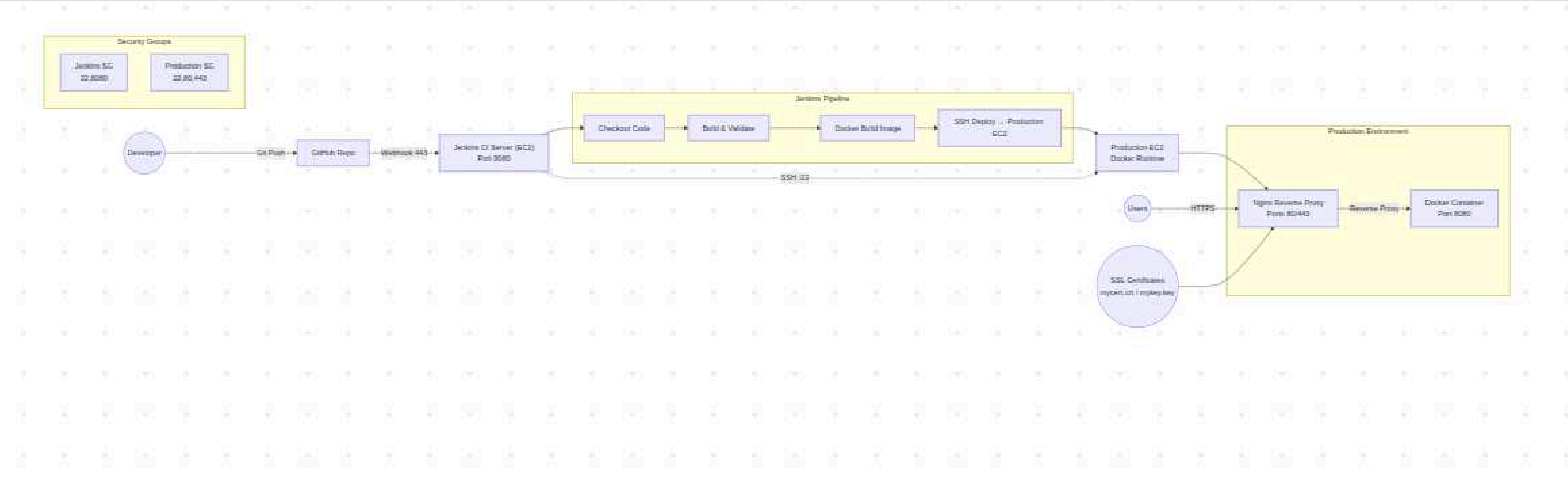
End-to-End DevOps CI/CD Pipeline on AWS

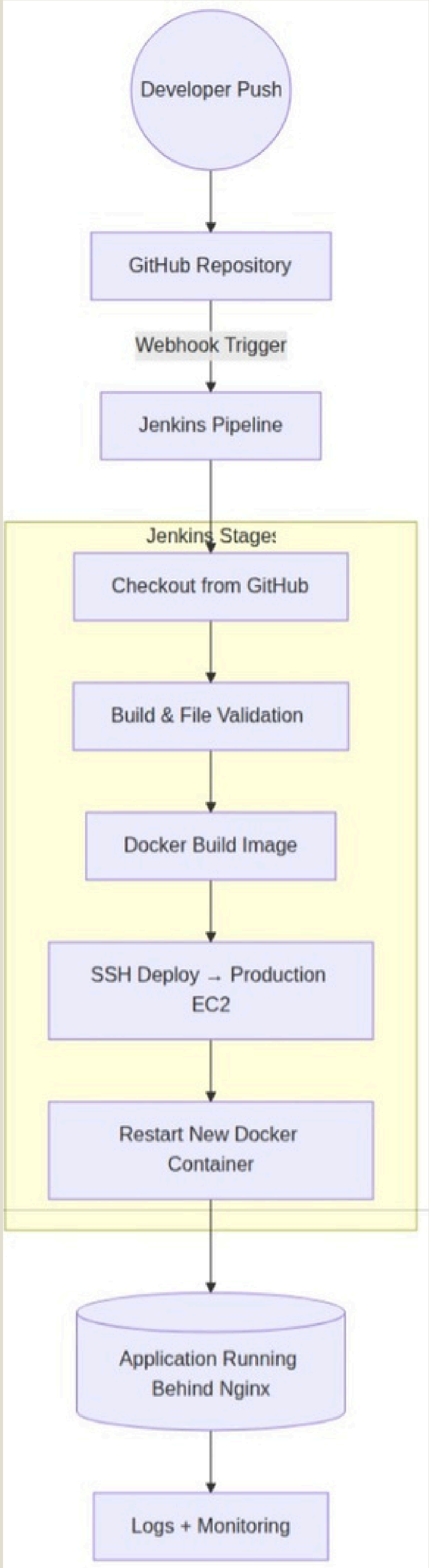
MOHAMED ELBARGUI — DevOps Case Study | 2025

by MOHAMED ELBARGUI | 2025

Architecture Diagram



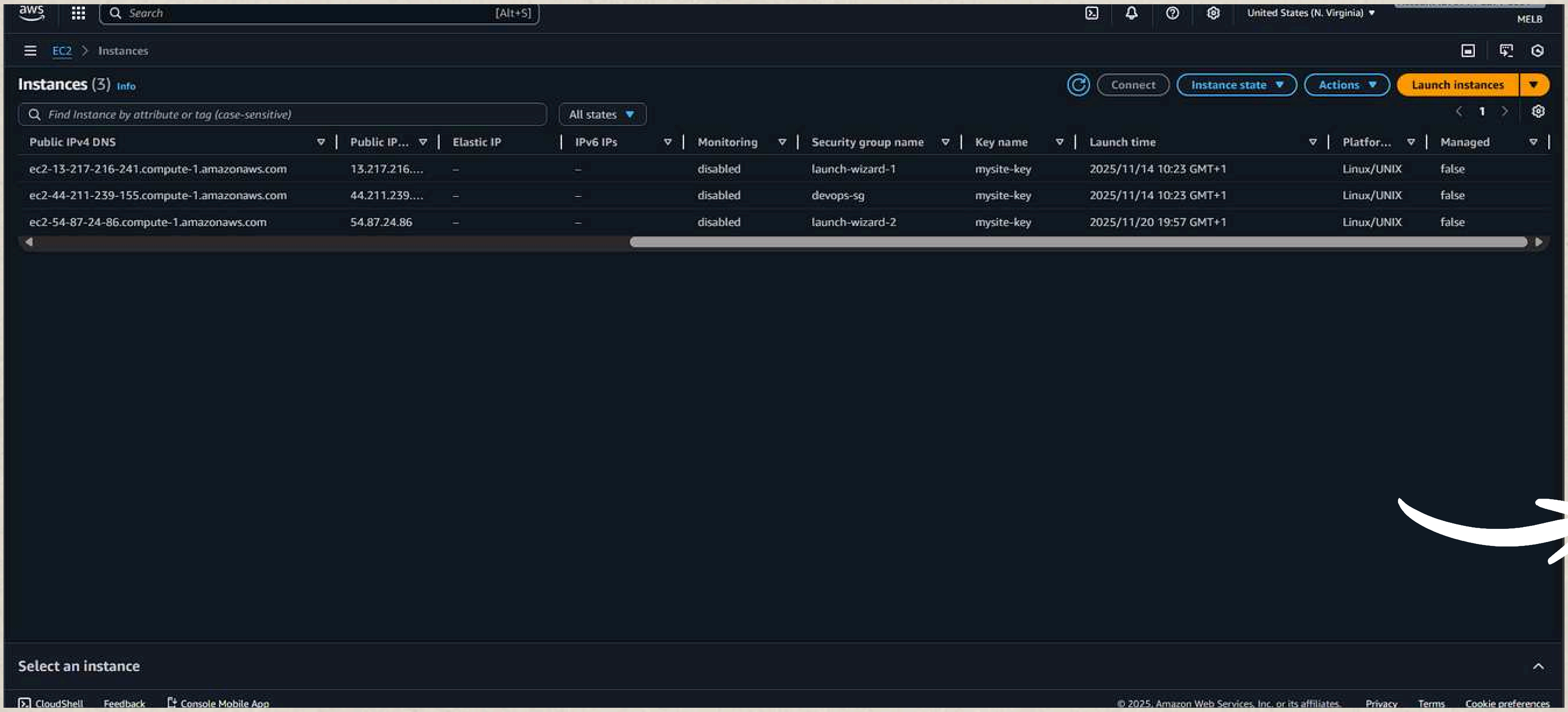
CI/CD Pipeline Diagram



AWS Infrastructure Overview

Three EC2 instances forming the CI/CD architecture

EC2 Instances Table

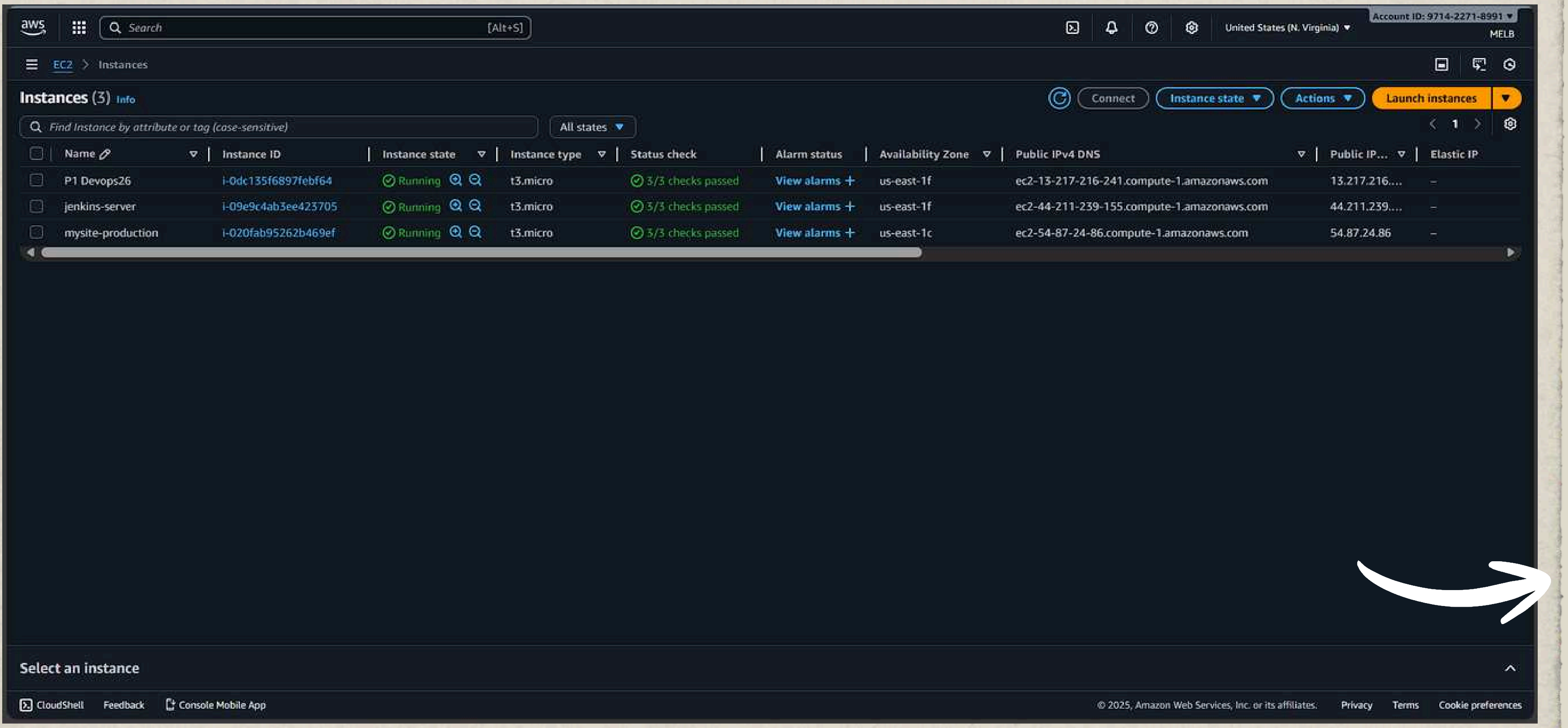


Public IPv4 DNS	Public IP...	Elastic IP	IPv6 IPs	Monitoring	Security group name	Key name	Launch time	Platfor...	Managed
ec2-13-217-216-241.compute-1.amazonaws.com	13.217.216....	–	–	disabled	launch-wizard-1	mysite-key	2025/11/14 10:23 GMT+1	Linux/UNIX	false
ec2-44-211-239-155.compute-1.amazonaws.com	44.211.239....	–	–	disabled	devops-sg	mysite-key	2025/11/14 10:23 GMT+1	Linux/UNIX	false
ec2-54-87-24-86.compute-1.amazonaws.com	54.87.24.86	–	–	disabled	launch-wizard-2	mysite-key	2025/11/20 19:57 GMT+1	Linux/UNIX	false

This dashboard shows the full AWS EC2 infrastructure.

- 3 instances deployed on Ubuntu 24.04
- Public & private IPs assigned
- Security Groups configured for SSH, HTTP, HTTPS & Jenkins
- Each instance mapped to a different role (CI, Webhook, Production)

EC2 Instances Again



Instances (3) Info

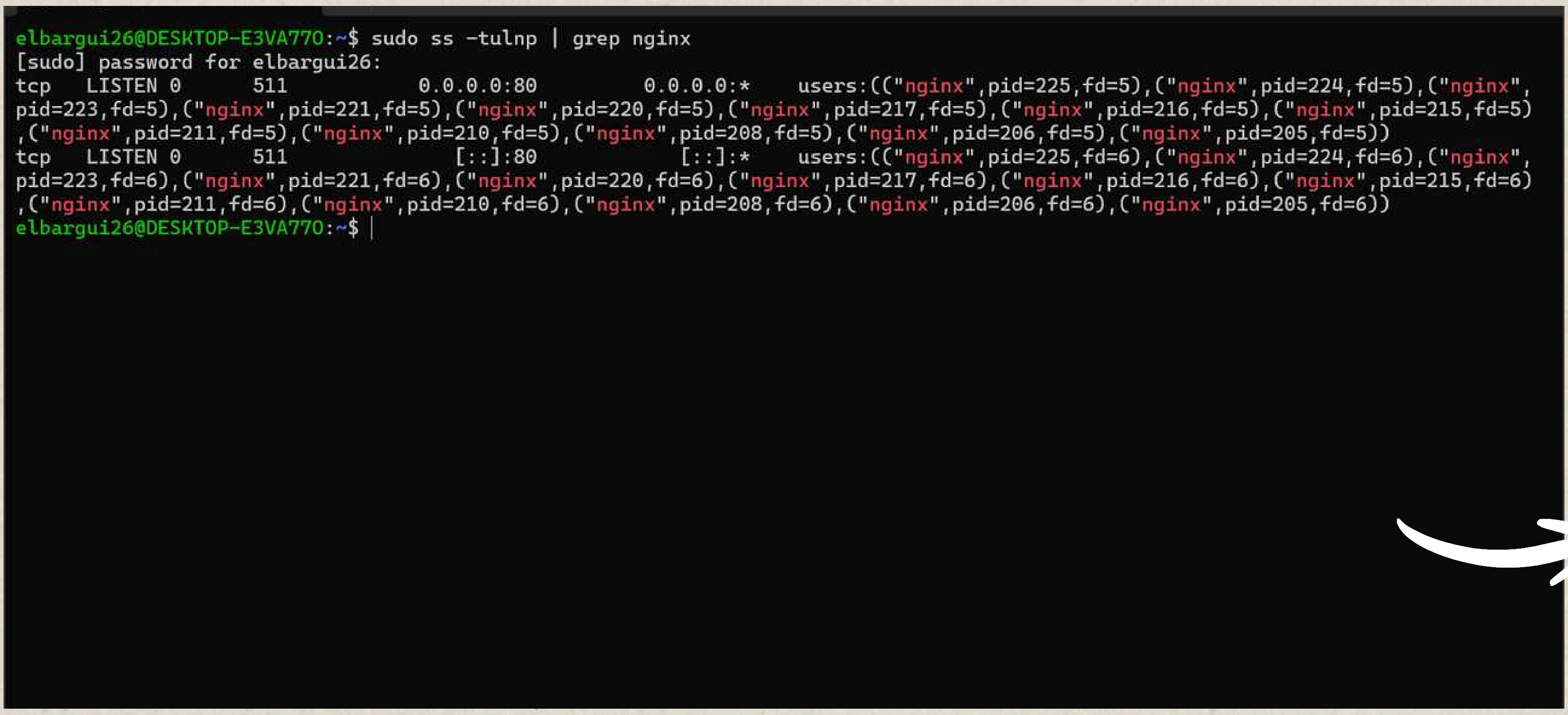
Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IP...	Elastic IP
P1 Devops26	i-0dc135f6897febf64	Running	t3.micro	3/3 checks passed	View alarms +	us-east-1f	ec2-13-217-216-241.compute-1.amazonaws.com	13.217.216....	–
jenkins-server	i-09e9c4ab3ee423705	Running	t3.micro	3/3 checks passed	View alarms +	us-east-1f	ec2-44-211-239-155.compute-1.amazonaws.com	44.211.239....	–
mysite-production	i-020fab95262b469ef	Running	t3.micro	3/3 checks passed	View alarms +	us-east-1c	ec2-54-87-24-86.compute-1.amazonaws.com	54.87.24.86	–

Detailed view of the running EC2 instances.

- Jenkins server (port 8080)
- Webhook listener handling GitHub triggers
- Production server running Docker + Nginx

All instances are active and connected in the pipeline.

ss -tulnp | grep nginx



```
elbargui26@DESKTOP-E3VA770:~$ sudo ss -tulnp | grep nginx
[sudo] password for elbargui26:
tcp   LISTEN 0      511          0.0.0.0:80         0.0.0.0:*    users:(("nginx",pid=225,fd=5),("nginx",pid=224,fd=5),("nginx",
pid=223,fd=5),("nginx",pid=221,fd=5),("nginx",pid=220,fd=5),("nginx",pid=217,fd=5),("nginx",pid=216,fd=5),("nginx",pid=215,fd=5)
,("nginx",pid=211,fd=5),("nginx",pid=210,fd=5),("nginx",pid=208,fd=5),("nginx",pid=206,fd=5),("nginx",pid=205,fd=5))
tcp   LISTEN 0      511             [::]:80            [::]:*    users:(("nginx",pid=225,fd=6),("nginx",pid=224,fd=6),("nginx",
pid=223,fd=6),("nginx",pid=221,fd=6),("nginx",pid=220,fd=6),("nginx",pid=217,fd=6),("nginx",pid=216,fd=6),("nginx",pid=215,fd=6)
,("nginx",pid=211,fd=6),("nginx",pid=210,fd=6),("nginx",pid=208,fd=6),("nginx",pid=206,fd=6),("nginx",pid=205,fd=6))
elbargui26@DESKTOP-E3VA770:~$ |
```

Verification of Nginx service on the production server.

- Port 80 open (HTTP)
- Nginx worker processes running
- Reverse proxy ready to receive traffic
- Confirms the server is correctly hosting the website

Security Groups & Network Configuration

EC2 Security Groups – Key Network Rule

Jenkins Server (SG: devops-sg) :

- Port 22 → SSH access
- Port 8080 → Jenkins UI
- Port 80 → Used by webhook listener

Production Server (launch-wizard-1)

Jenkins Server (SG: devops-sg) :

- Port 80 → HTTP
- Port 443 → HTTPS (Reverse proxy ready)
- Port 22 → SSH

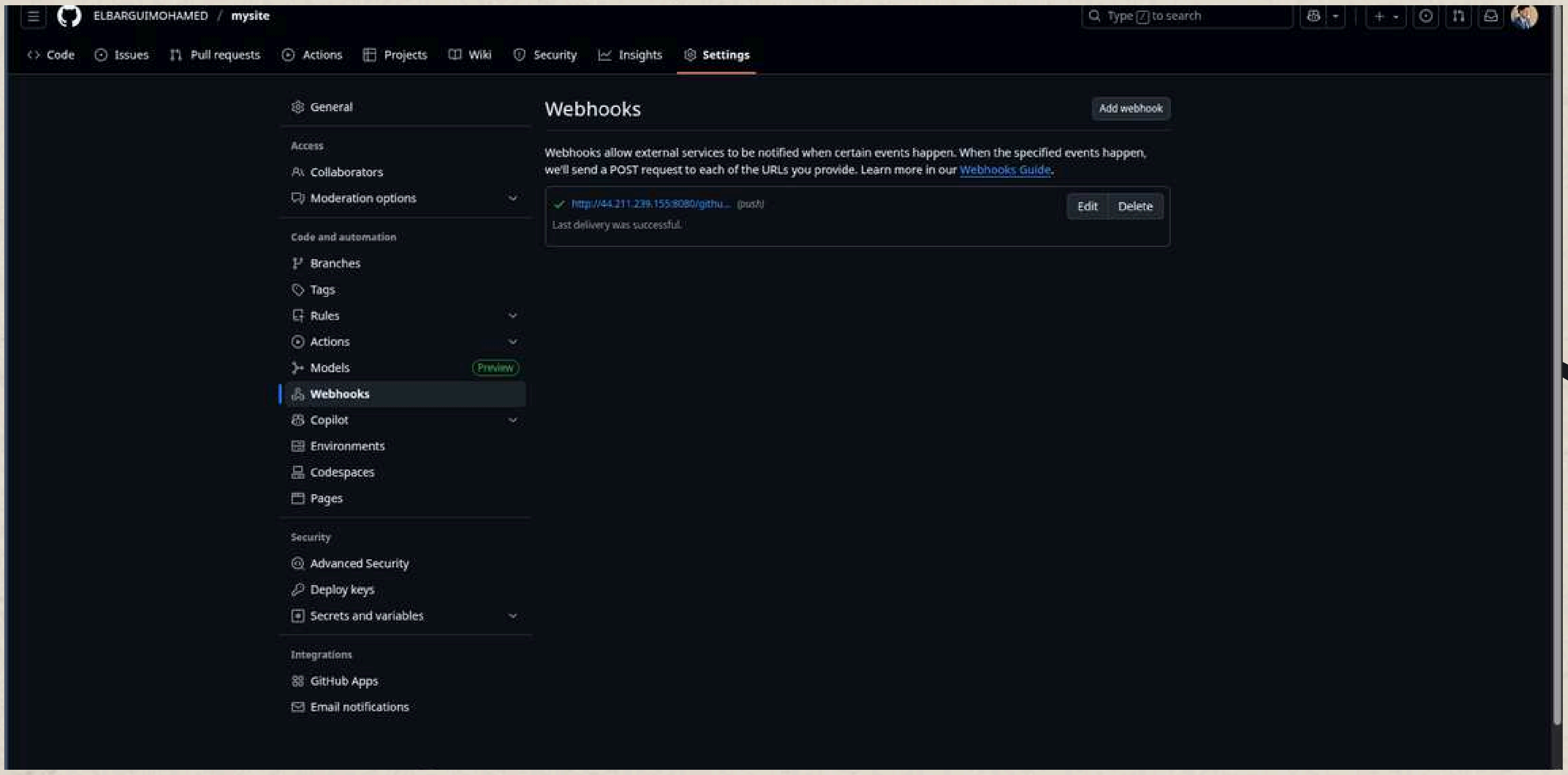
Webhook Listener / Tools Server (launch-wizard-2)

Jenkins Server (SG: devops-sg) :

- Port 22 → SSH
- Port 80 / 443 → HTTP/HTTPS

Security Groups & Network Configuration

GitHub Webhook Configuration



Webhooks

Webhooks allow external services to be notified when certain events happen. When the specified events happen, we'll send a POST request to each of the URLs you provide. Learn more in our Webhooks Guide.

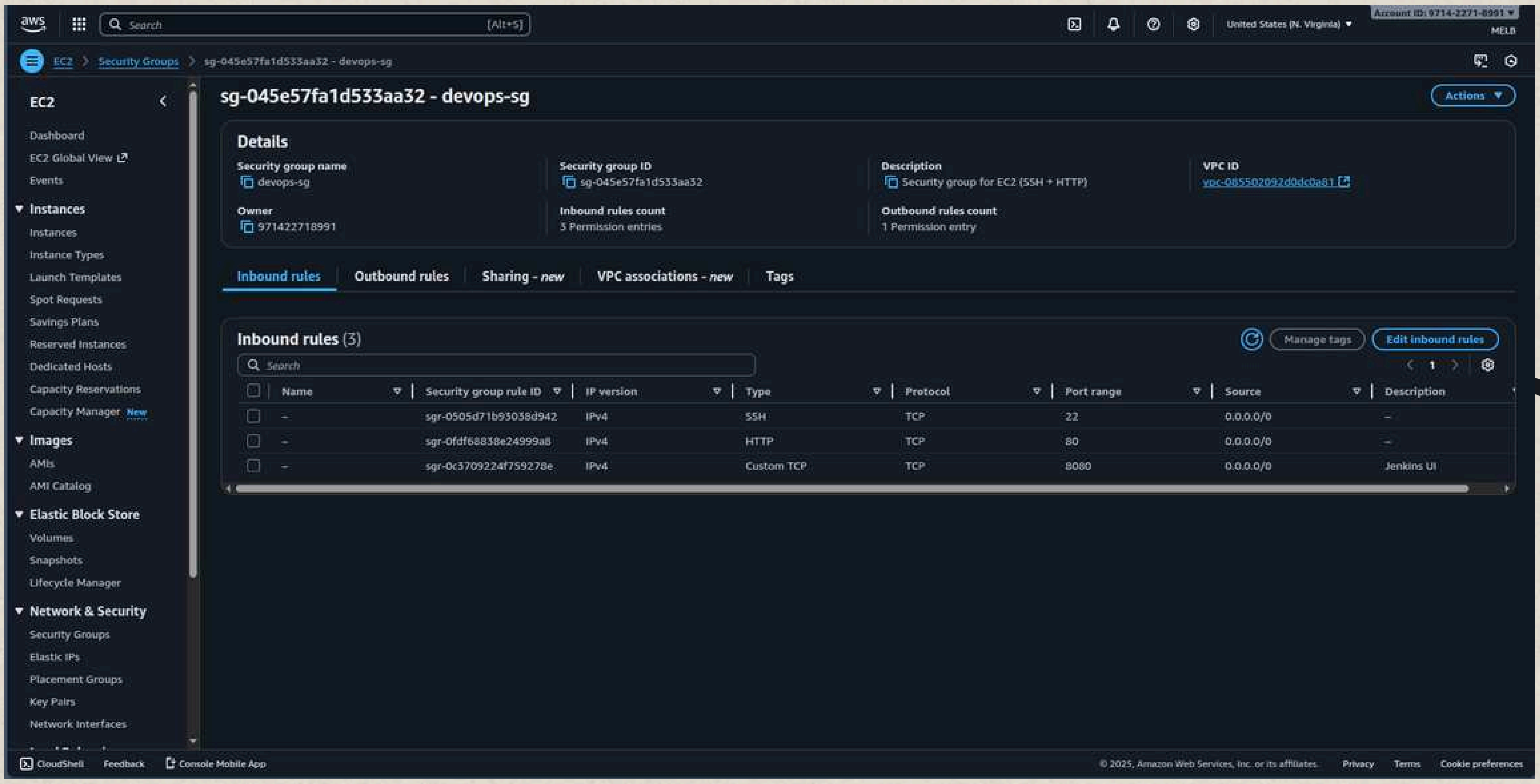
✓ http://44.211.239.155:8080/githu... (push)

Last delivery was successful.

The repository is connected to the Jenkins server through a webhook (port 8080). Every push triggers the CI pipeline automatically

Security Groups & Network Configuration

Jenkins Server – Security Group :



sg-045e57fa1d533aa32 - devops-sg

Details

Security group name: devops-sg

Security group ID: sg-045e57fa1d533aa32

Description: Security group for EC2 (SSH + HTTP)

VPC ID: vpc-085502092d0dc0a81

Owner: 971422718991

Inbound rules count: 3 Permission entries

Outbound rules count: 1 Permission entry

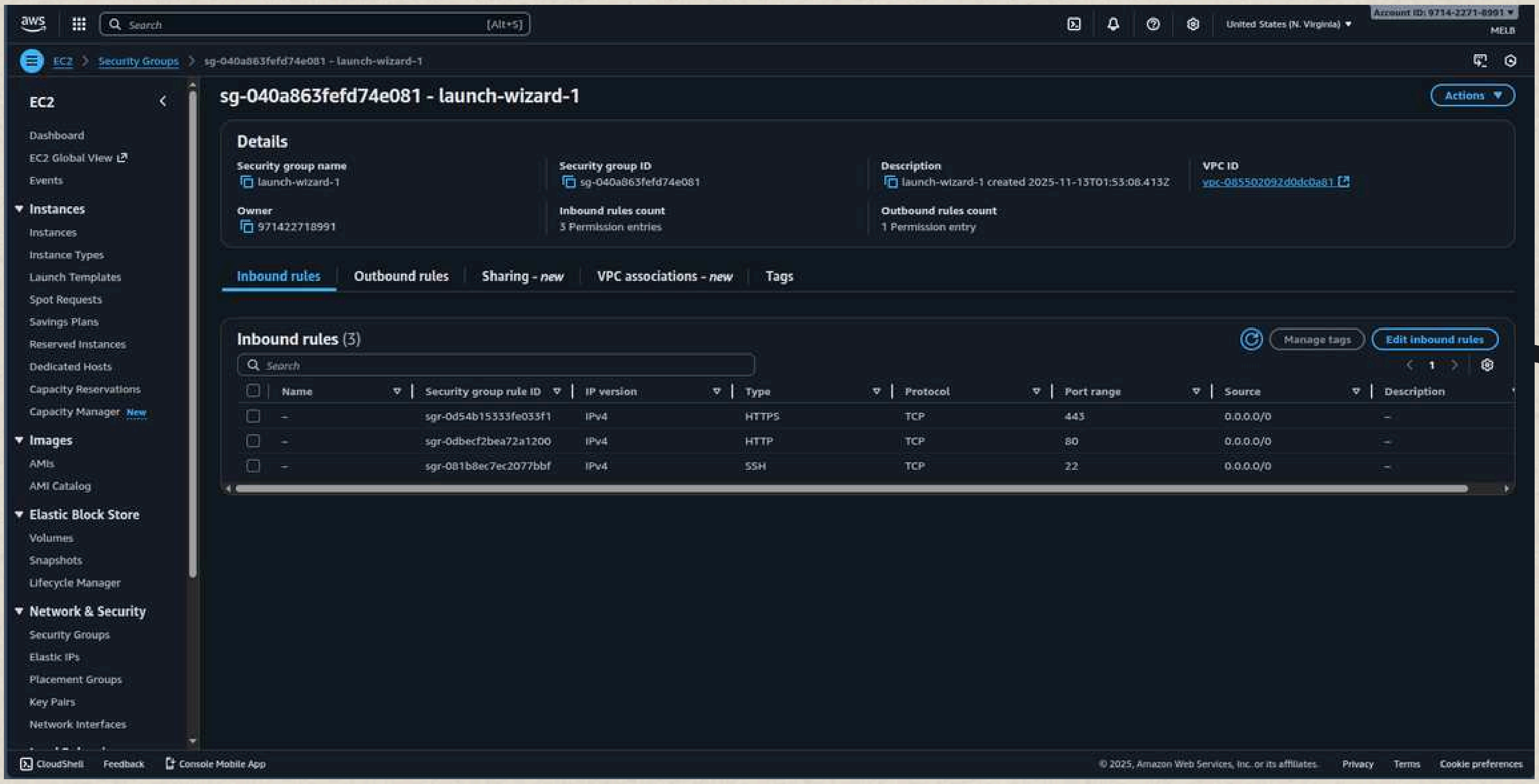
Inbound rules (3)

Name	Security group rule ID	IP version	Type	Protocol	Port range	Source	Description
–	sgr-0505d71b93038d942	IPv4	SSH	TCP	22	0.0.0.0/0	–
–	sgr-0fdf68838e24999a8	IPv4	HTTP	TCP	80	0.0.0.0/0	–
–	sgr-0c3709224f759278e	IPv4	Custom TCP	TCP	8080	0.0.0.0/0	Jenkins UI

Security rules allow SSH (22), Jenkins UI (8080), and HTTP (80).
This ensures Jenkins can receive webhooks and run builds securely.

Security Groups & Network Configuration

Tools/Webhook Server – Security Group



sg-040a863fefd74e081 - launch-wizard-1

Details

Security group name: launch-wizard-1

Security group ID: sg-040a863fefd74e081

Description: launch-wizard-1 created 2025-11-13T01:53:08.413Z

VPC ID: vpc-085502092d0dc0a81

Owner: 971422718991

Inbound rules count: 3 Permission entries

Outbound rules count: 1 Permission entry

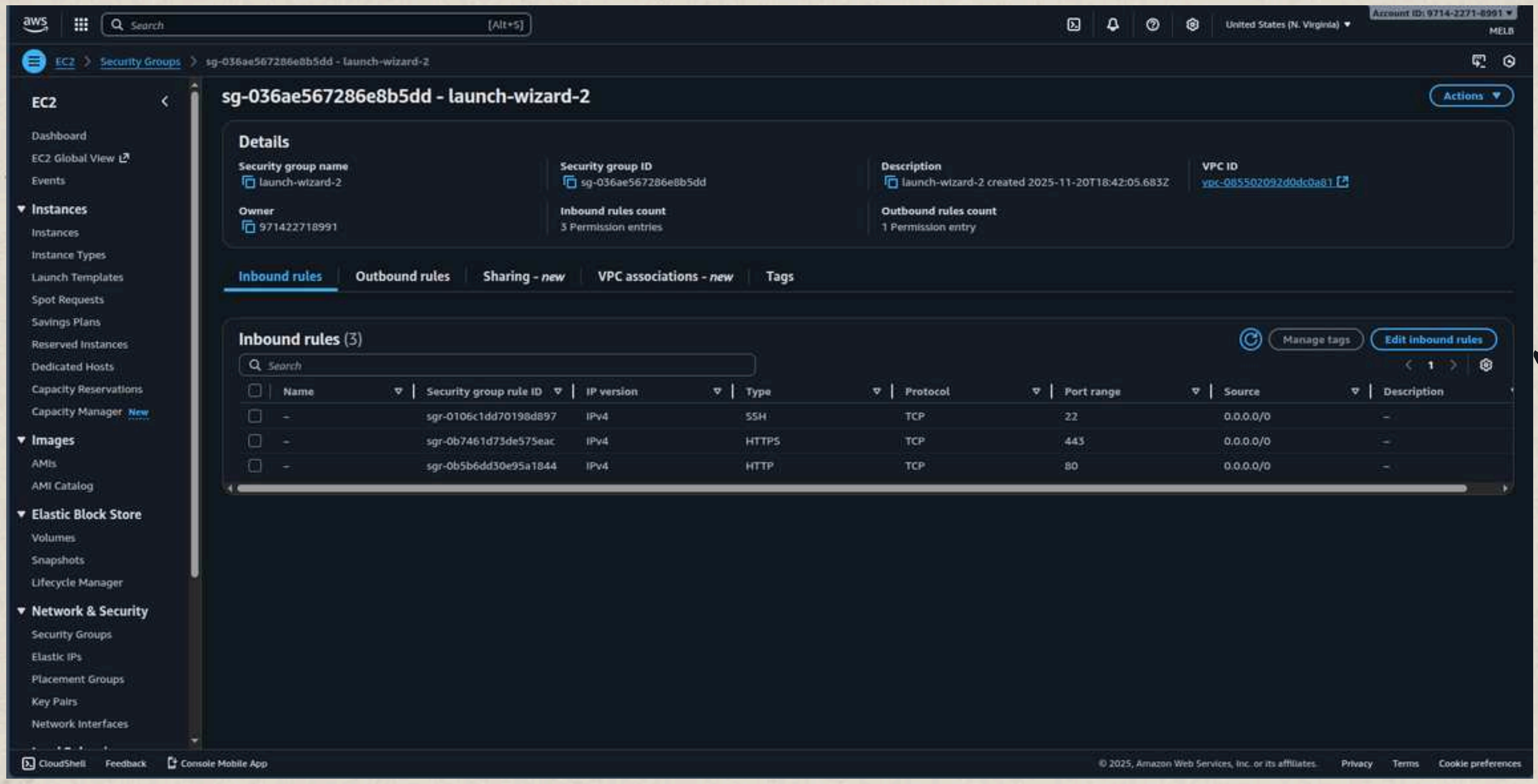
Inbound rules (3)

□	Name	Security group rule ID	IP version	Type	Protocol	Port range	Source	Description
□	–	sgr-0d54b15333fe033f1	IPv4	HTTPS	TCP	443	0.0.0.0/0	–
□	–	sgr-0dbecf2bea72a1200	IPv4	HTTP	TCP	80	0.0.0.0/0	–
□	–	sgr-081b8ec7ec2077bbf	IPv4	SSH	TCP	22	0.0.0.0/0	–

Production machine exposes ports 80/443 for the public website.
This server runs Nginx acting as a reverse proxy for the deployed site

Security Groups & Network Configuration

Production Server – Security Group



sg-036ae567286e8b5dd - launch-wizard-2

Details

Security group name: launch-wizard-2

Security group ID: sg-036ae567286e8b5dd

Description: launch-wizard-2 created 2025-11-20T18:42:05.683Z

VPC ID: vpc-085502092d0dc0a81

Owner: 971422718991

Inbound rules count: 3 Permission entries

Outbound rules count: 1 Permission entry

Inbound rules | Outbound rules | Sharing - *new* | VPC associations - *new* | Tags

Inbound rules (3)

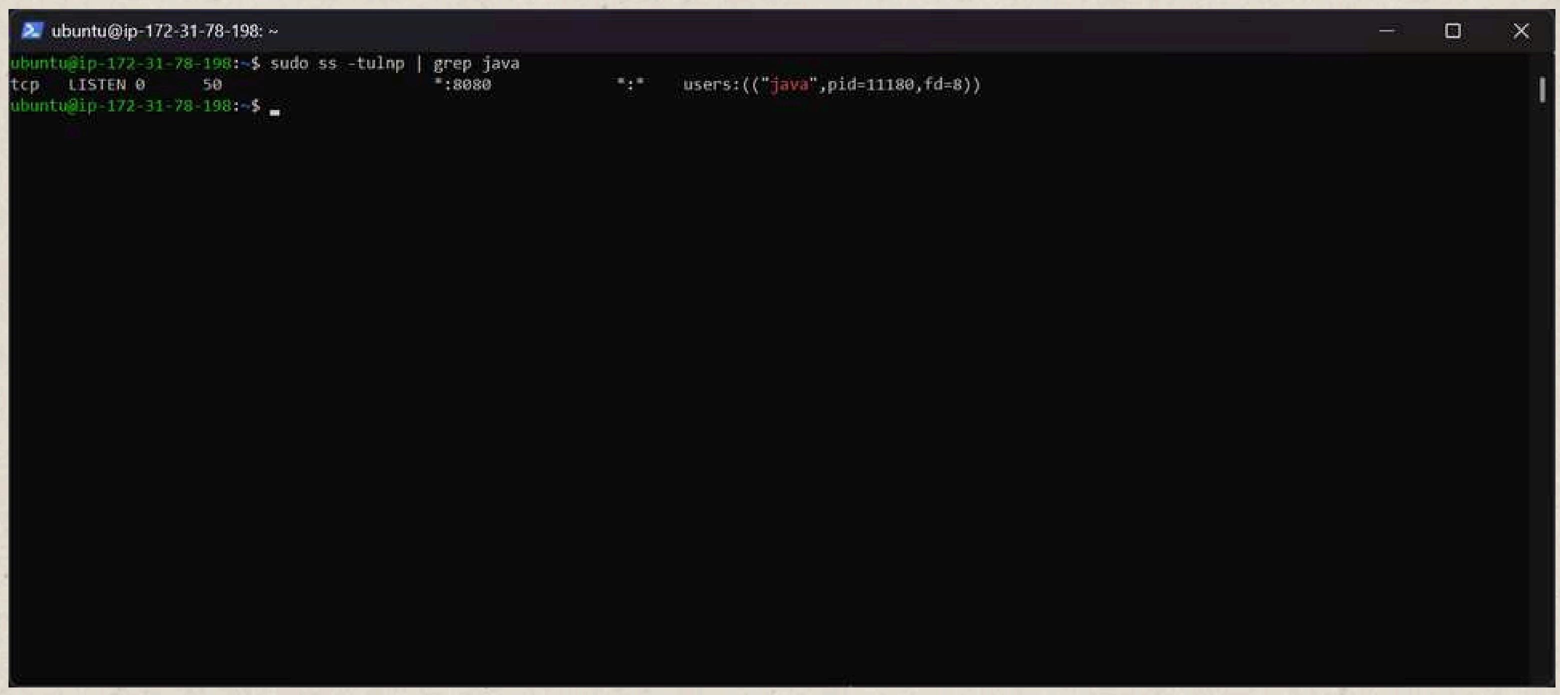
Name	Security group rule ID	IP version	Type	Protocol	Port range	Source	Description
–	sgr-0106c1dd70198d897	IPv4	SSH	TCP	22	0.0.0.0/0	–
–	sgr-0b7461d73de575eac	IPv4	HTTPS	TCP	443	0.0.0.0/0	–
–	sgr-0b5b6dd30e95a1844	IPv4	HTTP	TCP	80	0.0.0.0/0	–

Handles automation, webhook routing, HTTPS preparation, and CI utility tasks.

JENKINS INSTALLATION & SETUP

Three EC2 instances forming the CI/CD architecture

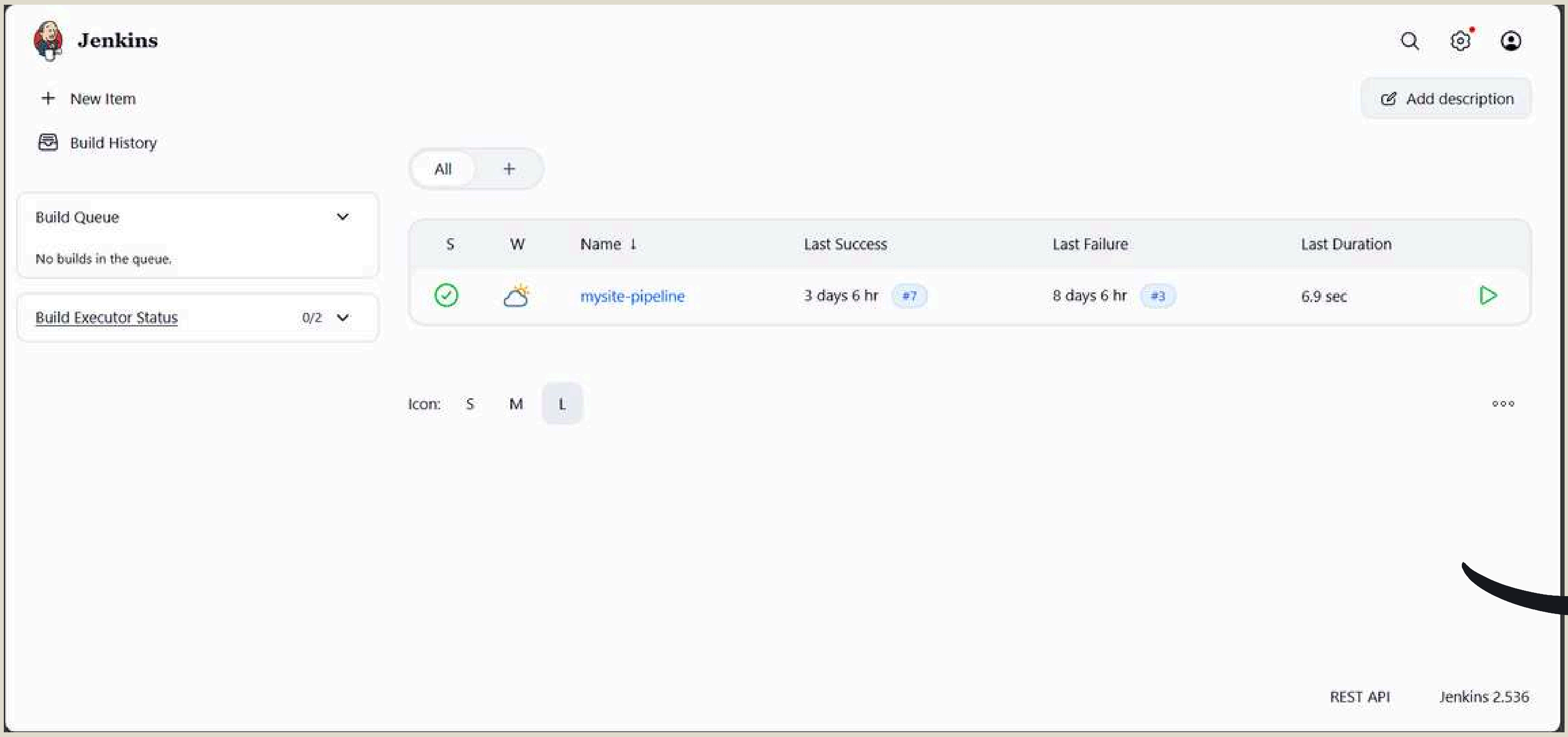
Jenkins Installation – Port 8080 open



```
ubuntu@ip-172-31-78-198:~$ sudo ss -tulnp | grep java
tcp   LISTEN 0      50                         *:8080                *:*    users:(("java",pid=11180,fd=8))
ubuntu@ip-172-31-78-198:~$ 
```

Opening Jenkins port (8080)
Allowed inbound traffic for Jenkins UI so the server can be accessed publicly.

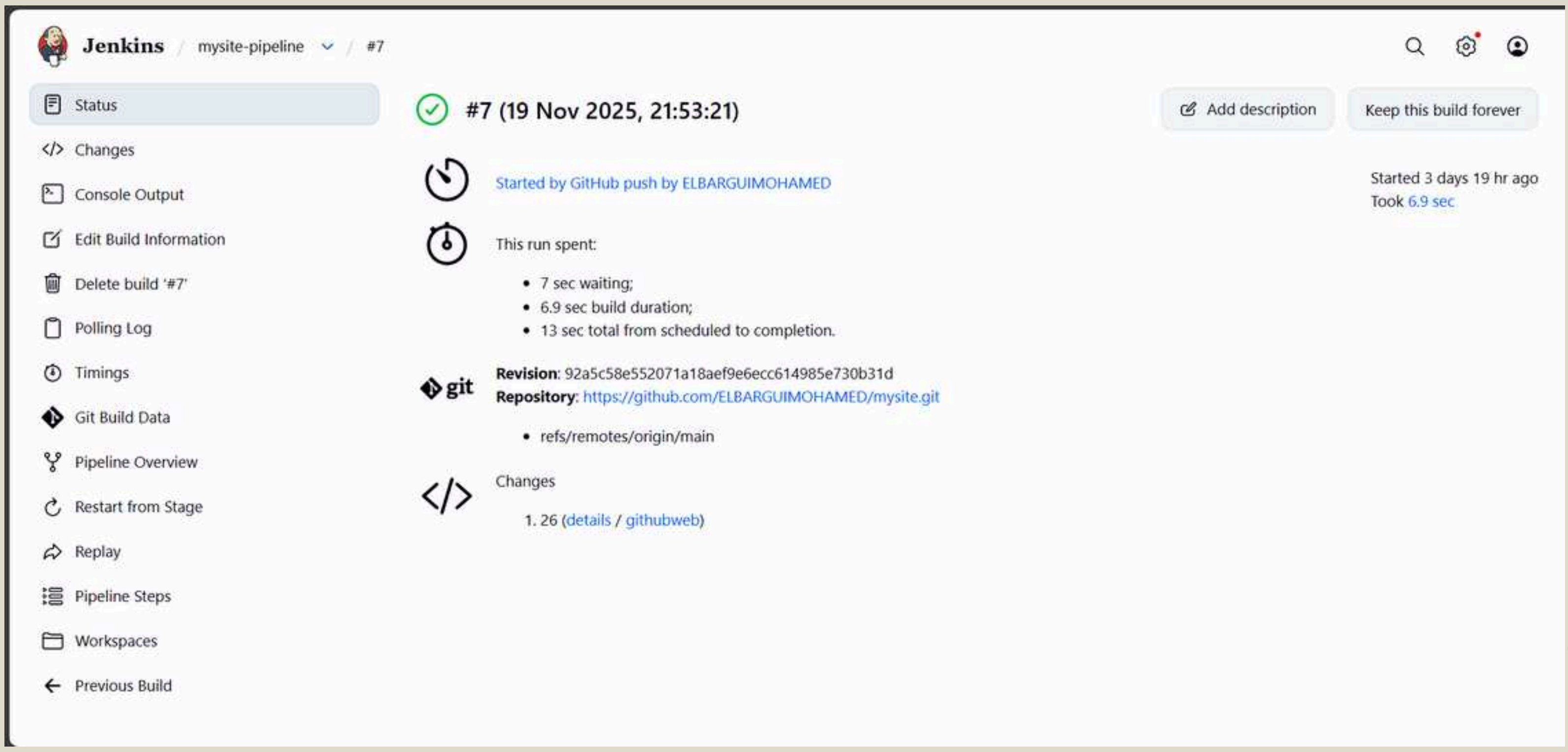
Jenkins UI access



S	W	Name ↓	Last Success	Last Failure	Last Duration
✓	⛅	mysite-pipeline	3 days 6 hr #7	8 days 6 hr #3	6.9 sec

Jenkins running successfully and accessible from the public IP on port 8080.

Jenkins Service Status



#7 (19 Nov 2025, 21:53:21)

Started by GitHub push by ELBARGUIMOHAMED

Started 3 days 19 hr ago
Took 6.9 sec

This run spent:

- 7 sec waiting;
- 6.9 sec build duration;
- 13 sec total from scheduled to completion.

Revision: 92a5c58e552071a18aef9e6ecc614985e730b31d
Repository: https://github.com/ELBARGUIMOHAMED/mysite.git

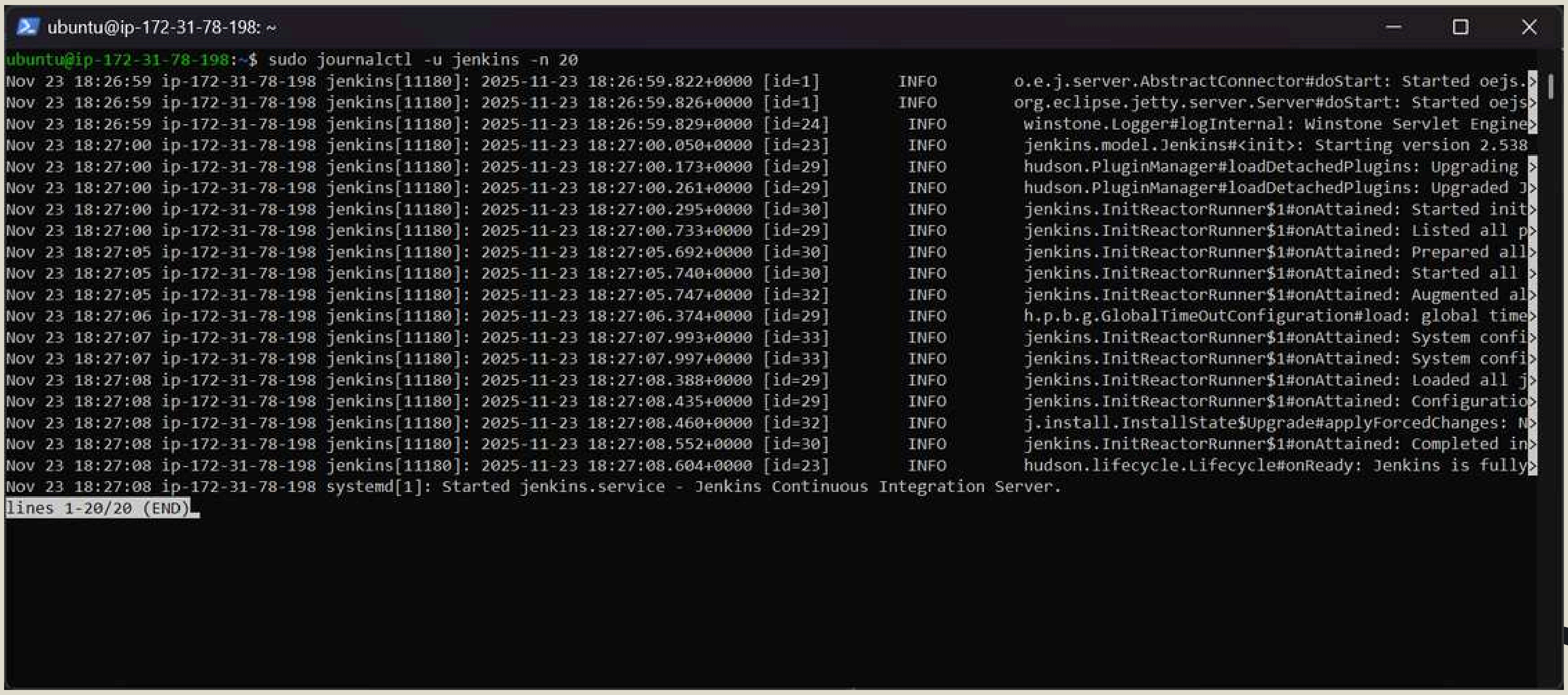
- refs/remotes/origin/main

Changes

1. 26 (details / githubweb)

Service is active and running using systemd, confirming stable installation.

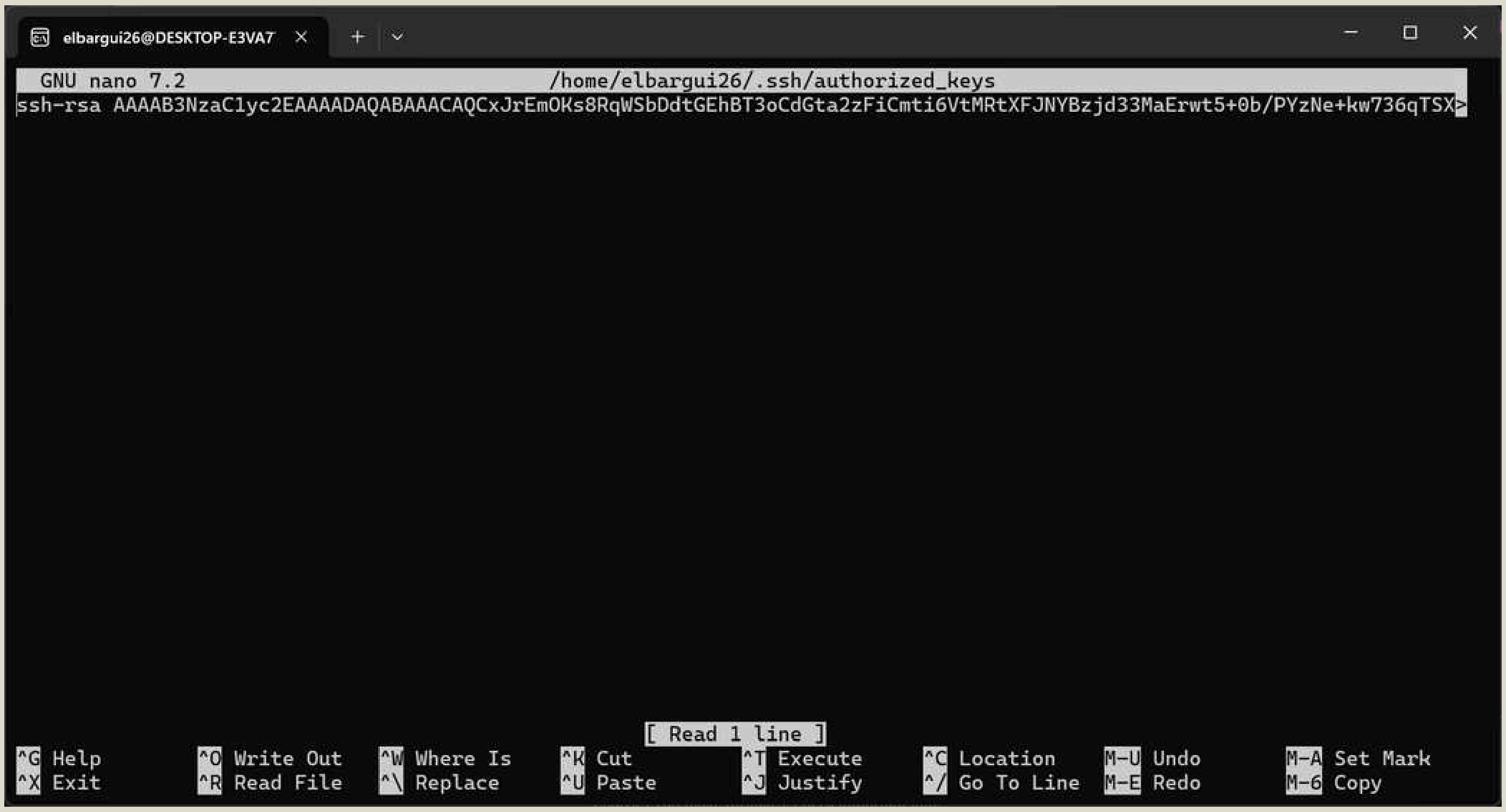
Jenkins startup logs



```
ubuntu@ip-172-31-78-198:~$ sudo journalctl -u jenkins -n 20
Nov 23 18:26:59 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:26:59.822+0000 [id=1]        INFO        o.e.j.server.AbstractConnector#doStart: Started oejs.>
Nov 23 18:26:59 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:26:59.826+0000 [id=1]        INFO        org.eclipse.jetty.server.Server#doStart: Started oejs>
Nov 23 18:26:59 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:26:59.829+0000 [id=24]        INFO        winstone.Logger#logInternal: Winstone Servlet Engine>
Nov 23 18:27:00 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:00.050+0000 [id=23]        INFO        jenkins.model.Jenkins#<init>: Starting version 2.538
Nov 23 18:27:00 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:00.173+0000 [id=29]        INFO        hudson.PluginManager#loadDetachedPlugins: Upgrading >
Nov 23 18:27:00 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:00.261+0000 [id=29]        INFO        hudson.PluginManager#loadDetachedPlugins: Upgraded J>
Nov 23 18:27:00 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:00.295+0000 [id=30]        INFO        jenkins.InitReactorRunner$1#onAttained: Started init>
Nov 23 18:27:00 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:00.733+0000 [id=29]        INFO        jenkins.InitReactorRunner$1#onAttained: Listed all p>
Nov 23 18:27:05 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:05.692+0000 [id=30]        INFO        jenkins.InitReactorRunner$1#onAttained: Prepared all>
Nov 23 18:27:05 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:05.740+0000 [id=30]        INFO        jenkins.InitReactorRunner$1#onAttained: Started all >
Nov 23 18:27:05 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:05.747+0000 [id=32]        INFO        jenkins.InitReactorRunner$1#onAttained: Augmented al>
Nov 23 18:27:06 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:06.374+0000 [id=29]        INFO        h.p.b.g.GlobalTimeOutConfiguration#load: global time>
Nov 23 18:27:07 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:07.993+0000 [id=33]        INFO        jenkins.InitReactorRunner$1#onAttained: System confi>
Nov 23 18:27:07 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:07.997+0000 [id=33]        INFO        jenkins.InitReactorRunner$1#onAttained: System confi>
Nov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.388+0000 [id=29]        INFO        jenkins.InitReactorRunner$1#onAttained: Loaded all j>
Nov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.435+0000 [id=29]        INFO        jenkins.InitReactorRunner$1#onAttained: Configuratio>
Nov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.460+0000 [id=32]        INFO        j.install.InstallState$Upgrade#applyForcedChanges: N>
Nov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.552+0000 [id=30]        INFO        jenkins.InitReactorRunner$1#onAttained: Completed in>
Nov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.604+0000 [id=23]        INFO        hudson.lifecycle.Lifecycle#onReady: Jenkins is fully>
Nov 23 18:27:08 ip-172-31-78-198 systemd[1]: Started jenkins.service - Jenkins Continuous Integration Server.
lines 1-20/20 (END)
```

Verified that Jenkins plugins were loaded and the service completed initialization.

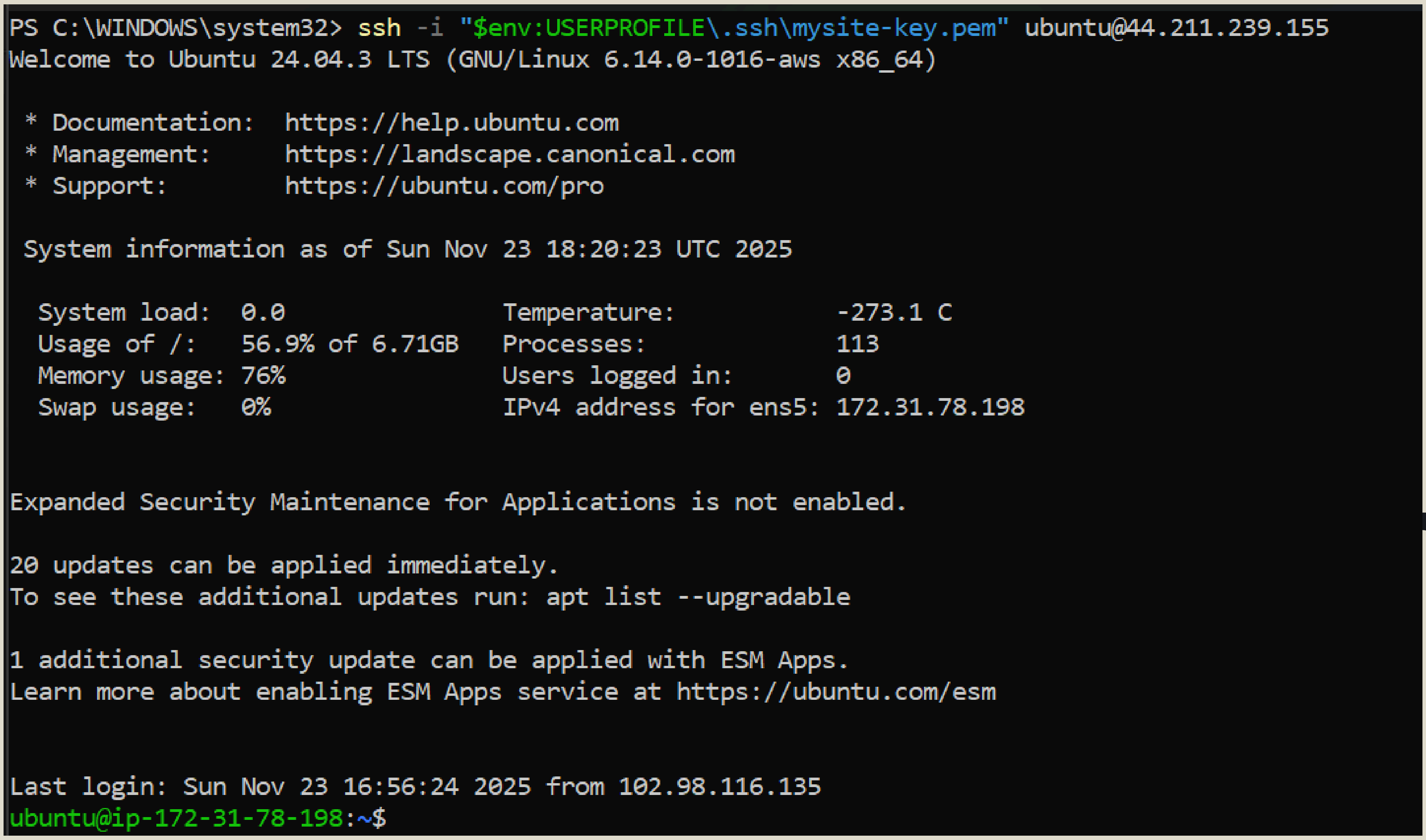
SSH access to Jenkins server



```
  GNU nano 7.2                           /home/elbargui26/.ssh/authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAACAQCxJrEmOKs8RqWSbDdtGEhBT3oCdGta2zFiCmti6VtMRtXFJNYBzjd33MaErwt5+0b/PYzNe+kw736qTSX>





                                                   [ Read 1 line ]
^G Help          ^O Write Out     ^W Where Is      ^K Cut           ^T Execute       ^C Location      M-U Undo         M-A Set Mark
^X Exit          ^R Read File     ^\ Replace       ^U Paste         ^J Justify       ^/ Go To Line    M-E Redo         M-6 Copy
```

Connected using the EC2 key to manage Jenkins installation and configuration.

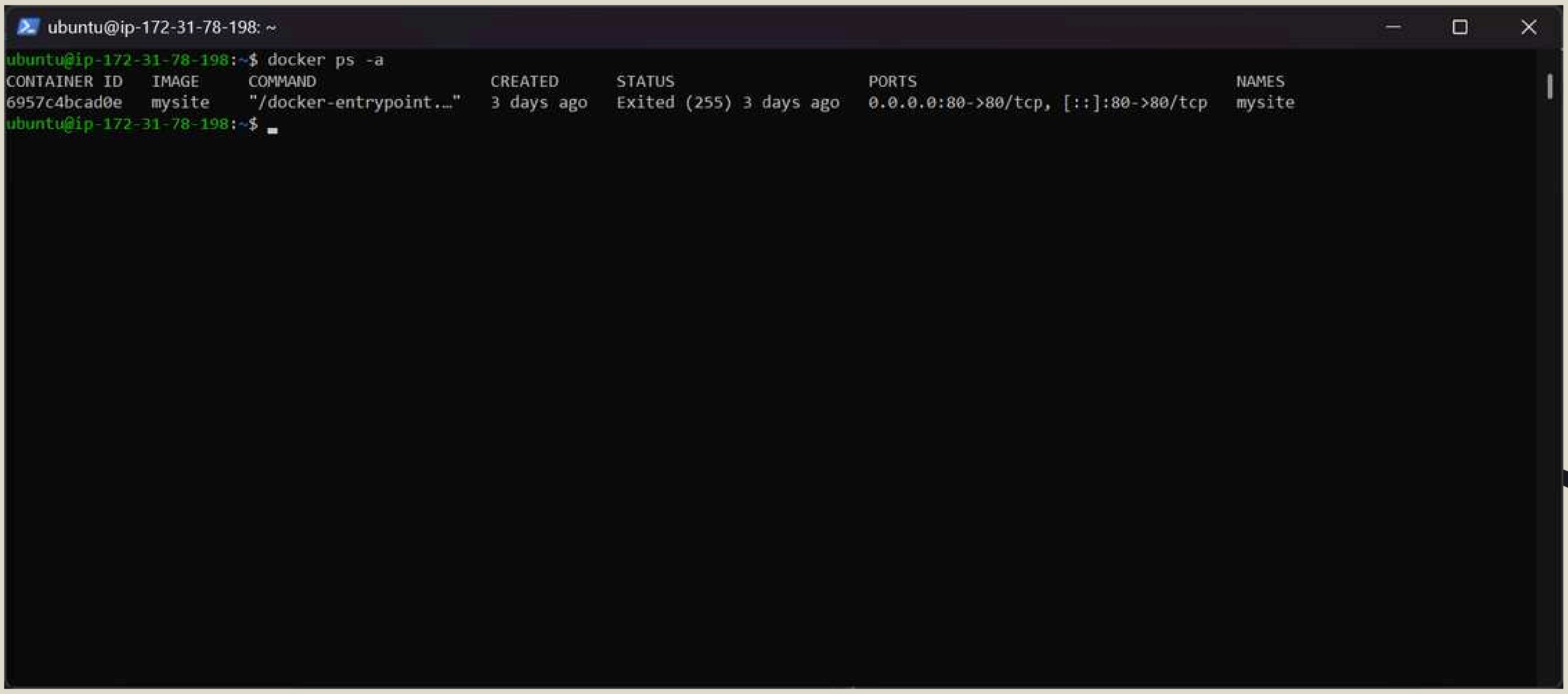
Java process running



```
PS C:\WINDOWS\system32> ssh -i "$env:USERPROFILE\.ssh\mysite-key.pem" ubuntu@44.211.239.155
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-1016-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

 System information as of Sun Nov 23 18:20:23 UTC 2025

  System load:  0.0               Temperature:           -273.1 C
  Usage of /:   56.9% of 6.71GB   Processes:             113
  Memory usage: 76%               Users logged in:       0
  Swap usage:   0%                IPv4 address for ens5: 172.31.78.198


Expanded Security Maintenance for Applications is not enabled.

20 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

1 additional security update can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm


Last login: Sun Nov 23 16:56:24 2025 from 102.98.116.135
ubuntu@ip-172-31-78-198:~$
```

Confirmed Jenkins is running over Java on port 8080.

Docker environment verification



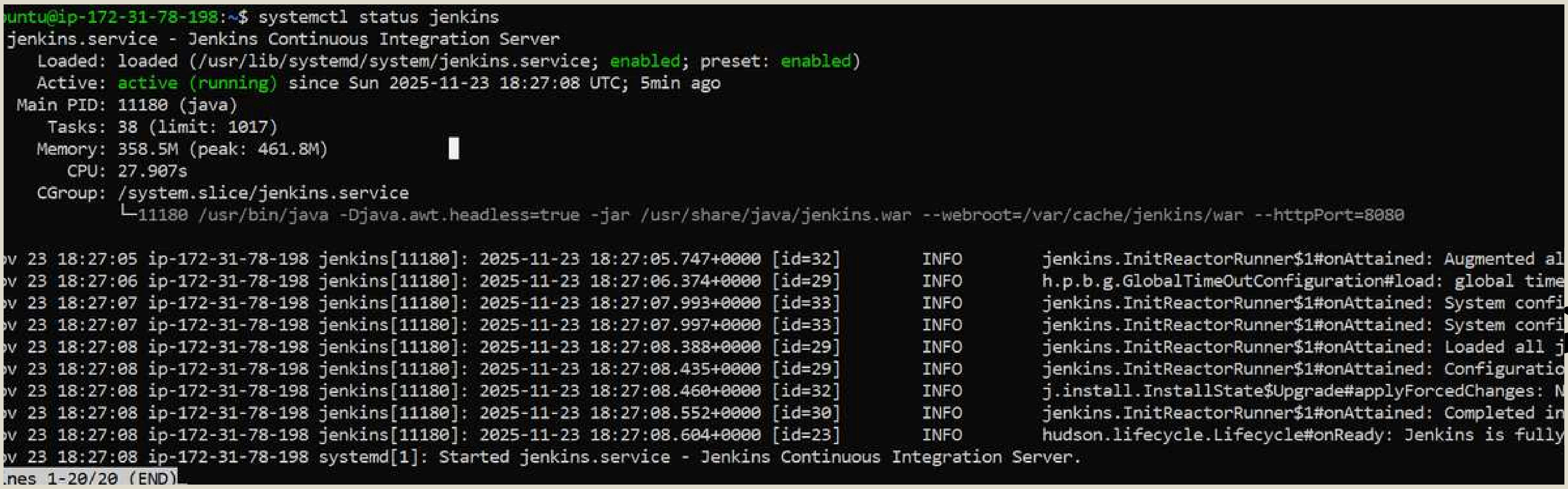
```
ubuntu@ip-172-31-78-198:~$ docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED      STATUS                     PORTS                                 NAMES
6957c4bcad0e   mysite    "/docker-entrypoint.…"   3 days ago   Exited (255) 3 days ago   0.0.0.0:80->80/tcp, [::]:80->80/tcp   mysite
ubuntu@ip-172-31-78-198:~$ 
```

Confirmed Jenkins is running over Java on port 8080.

GitHub Integration & Webhooks

Three EC2 instances forming the CI/CD architecture

Verifying Jenkins Webhook Port (8080)



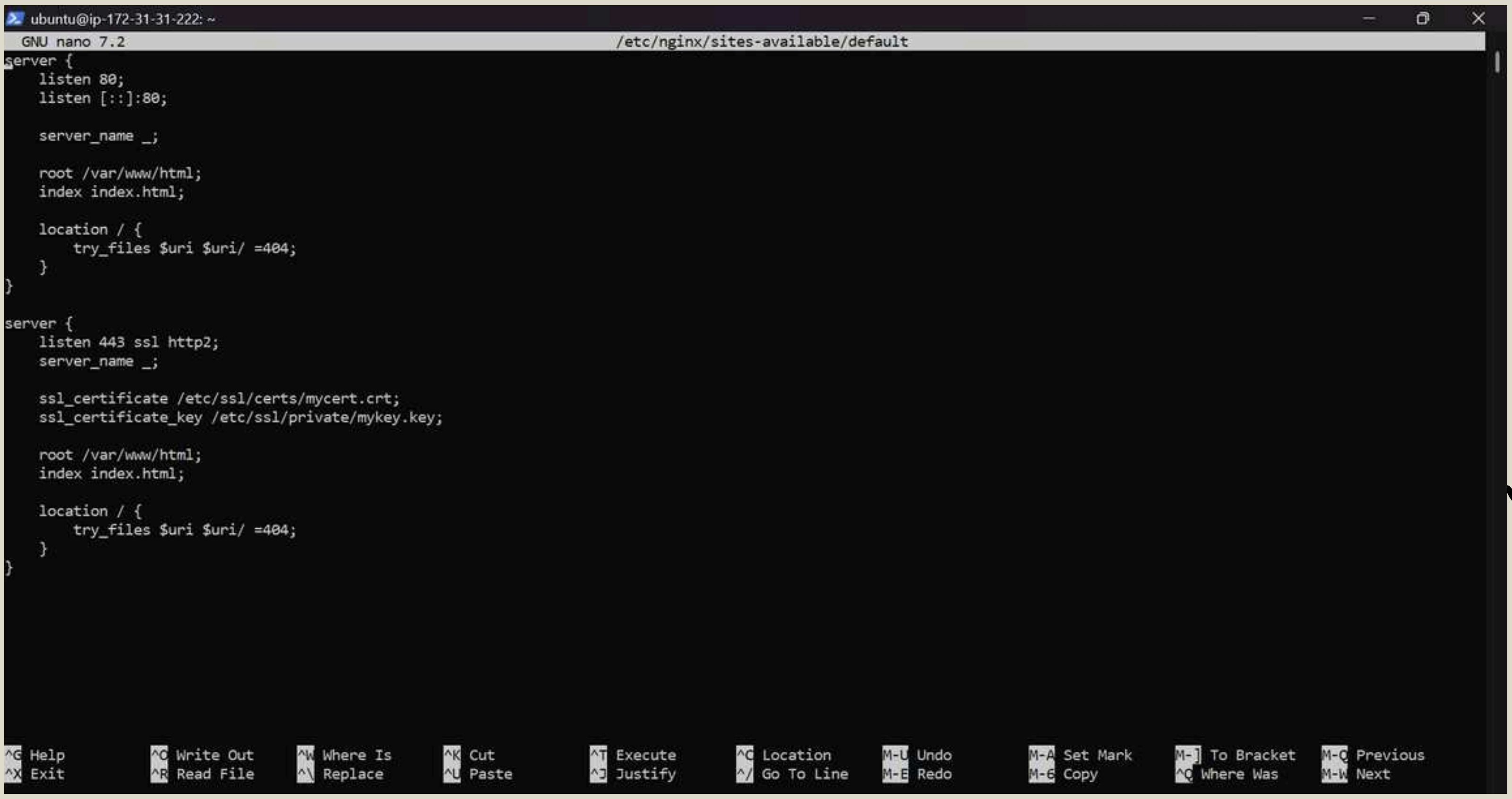
```
untu@ip-172-31-78-198:~$ systemctl status jenkins
 jenkins.service - Jenkins Continuous Integration Server
    Loaded: loaded (/usr/lib/systemd/system/jenkins.service; enabled; preset: enabled)
    Active: active (running) since Sun 2025-11-23 18:27:08 UTC; 5min ago
  Main PID: 11180 (java)
     Tasks: 38 (limit: 1017)
    Memory: 358.5M (peak: 461.8M)
       CPU: 27.907s
    CGroup: /system.slice/jenkins.service
            └─11180 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=/var/cache/jenkins/war --httpPort=8080

ov 23 18:27:05 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:05.747+0000 [id=32]        INFO        jenkins.InitReactorRunner$1#onAttained: Augmented al
ov 23 18:27:06 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:06.374+0000 [id=29]        INFO        h.p.b.g.GlobalTimeOutConfiguration#load: global time
ov 23 18:27:07 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:07.993+0000 [id=33]        INFO        jenkins.InitReactorRunner$1#onAttained: System confi
ov 23 18:27:07 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:07.997+0000 [id=33]        INFO        jenkins.InitReactorRunner$1#onAttained: System confi
ov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.388+0000 [id=29]        INFO        jenkins.InitReactorRunner$1#onAttained: Loaded all j
ov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.435+0000 [id=29]        INFO        jenkins.InitReactorRunner$1#onAttained: Configuratio
ov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.460+0000 [id=32]        INFO        j.install.InstallState$Upgrade#applyForcedChanges: N
ov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.552+0000 [id=30]        INFO        jenkins.InitReactorRunner$1#onAttained: Completed in
ov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.604+0000 [id=23]        INFO        hudson.lifecycle.Lifecycle#onReady: Jenkins is fully
ov 23 18:27:08 ip-172-31-78-198 systemd[1]: Started jenkins.service - Jenkins Continuous Integration Server.
.nes 1-20/20 (END)
```

This screenshot confirms that Jenkins is actively running on port 8080 using the Java process.

The command :

sudo ss -tulnp | grep java
shows that port 8080 is listening, meaning Jenkins is ready to receive webhook events from GitHub without connection issues.

Jenkins Pipeline Triggered Automatically via GitHub Push



```
ubuntu@ip-172-31-31-222: ~
  GNU nano 7.2                                  /etc/nginx/sites-available/default
server {
    listen 80;
    listen [::]:80;

    server_name _;

    root /var/www/html;
    index index.html;

    location / {
        try_files $uri $uri/ =404;
    }
}

server {
    listen 443 ssl http2;
    server_name _;

    ssl_certificate /etc/ssl/certs/mycert.crt;
    ssl_certificate_key /etc/ssl/private/mykey.key;

    root /var/www/html;
    index index.html;

    location / {
        try_files $uri $uri/ =404;
    }
}

^G Help        ^O Write Out   ^W Where Is    ^K Cut         ^T Execute     ^C Location    M-U Undo       M-A Set Mark   M-] To Bracket M-Q Previous
^X Exit        ^R Read File   ^\ Replace     ^U Paste       ^J Justify     ^/ Go To Line  M-E Redo       M-6 Copy       ^Q Where Was   M-W Next
```

This image demonstrates that the CI/CD pipeline was successfully triggered by a GitHub push.

Jenkins detected the change through the webhook and executed the pipeline automatically.

The logs confirm:

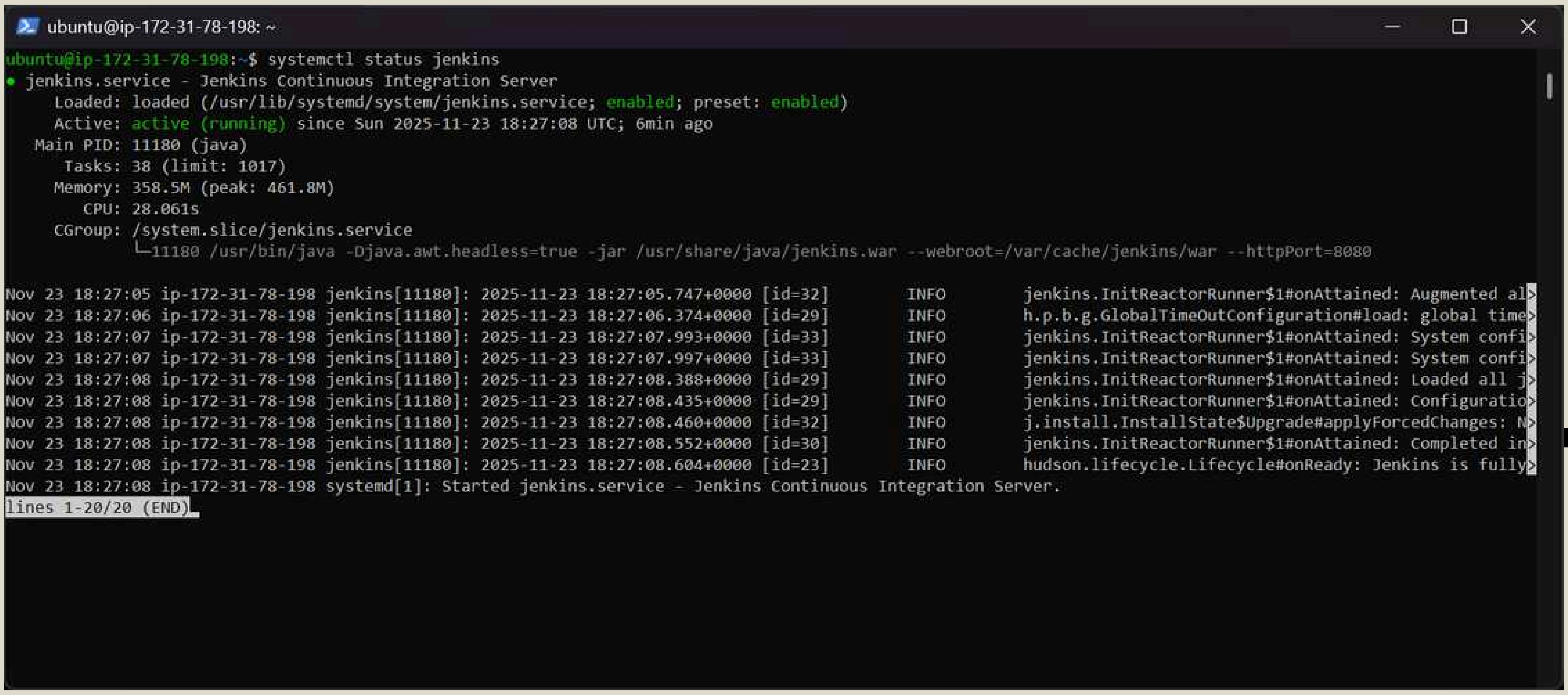
- Triggered by GitHub push event
- Source: origin/main
- Build completed successfully

This validates a fully working GitHub → Jenkins automated pipeline.

CI/CD Pipeline

Three EC2 instances forming the CI/CD architecture

Jenkins Pipeline Trigger Logs — Build Started Successfully



ubuntu@ip-172-31-78-198: ~

```
ubuntu@ip-172-31-78-198:~$ systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
     Loaded: loaded (/usr/lib/systemd/system/jenkins.service; enabled; preset: enabled)
     Active: active (running) since Sun 2025-11-23 18:27:08 UTC; 6min ago
   Main PID: 11180 (java)
      Tasks: 38 (limit: 1017)
     Memory: 358.5M (peak: 461.8M)
        CPU: 28.061s
     CGroup: /system.slice/jenkins.service
             └─11180 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=/var/cache/jenkins/war --httpPort=8080

Nov 23 18:27:05 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:05.747+0000 [id=32]        INFO        jenkins.InitReactorRunner$1#onAttained: Augmented al>
Nov 23 18:27:06 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:06.374+0000 [id=29]        INFO        h.p.b.g.GlobalTimeOutConfiguration#load: global time>
Nov 23 18:27:07 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:07.993+0000 [id=33]        INFO        jenkins.InitReactorRunner$1#onAttained: System confi>
Nov 23 18:27:07 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:07.997+0000 [id=33]        INFO        jenkins.InitReactorRunner$1#onAttained: System confi>
Nov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.388+0000 [id=29]        INFO        jenkins.InitReactorRunner$1#onAttained: Loaded all j>
Nov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.435+0000 [id=29]        INFO        jenkins.InitReactorRunner$1#onAttained: Configuratio>
Nov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.460+0000 [id=32]        INFO        j.install.InstallState$Upgrade#applyForcedChanges: N>
Nov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.552+0000 [id=30]        INFO        jenkins.InitReactorRunner$1#onAttained: Completed in>
Nov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.604+0000 [id=23]        INFO        hudson.lifecycle.Lifecycle#onReady: Jenkins is fully>
Nov 23 18:27:08 ip-172-31-78-198 systemd[1]: Started jenkins.service - Jenkins Continuous Integration Server.
lines 1-20/20 (END)
```

Explanation:

This screenshot shows the Jenkins service logs right after triggering a pipeline execution.

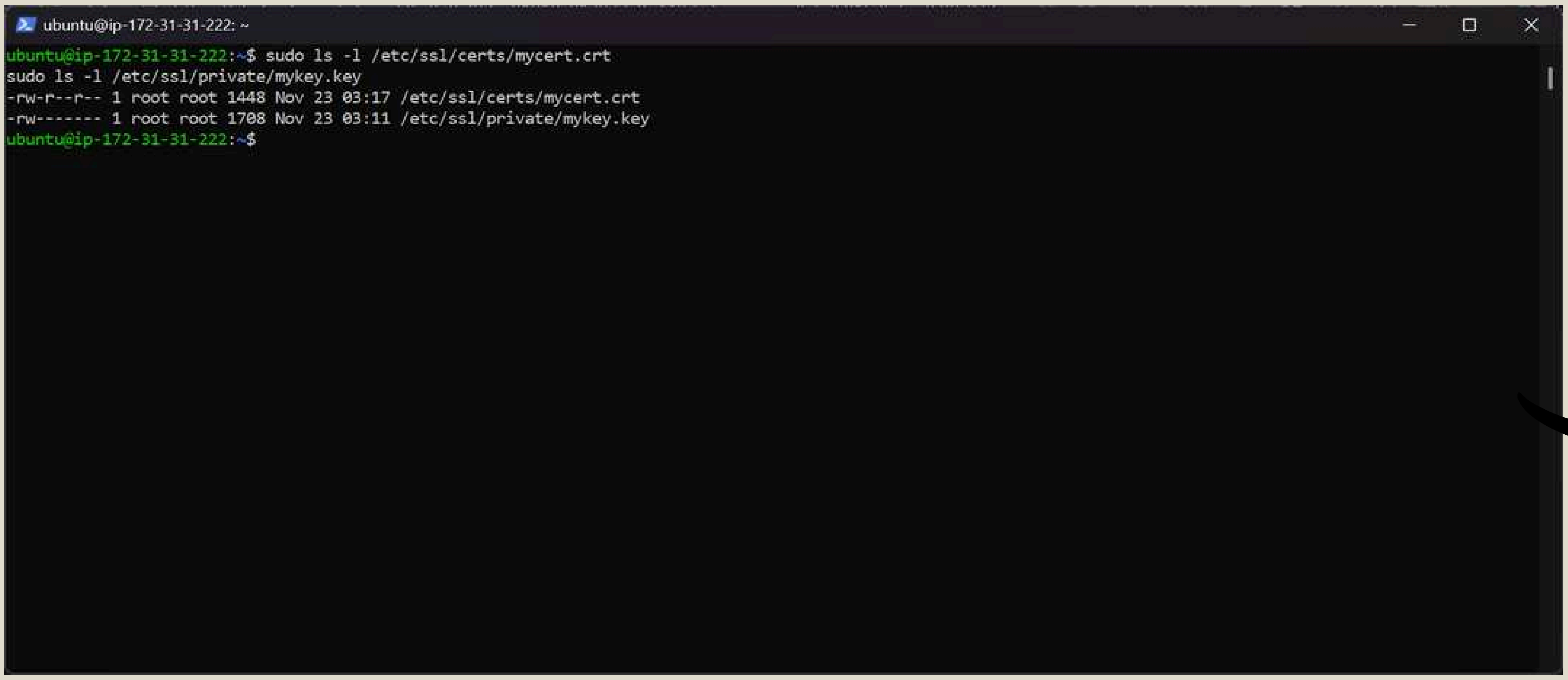
The logs confirm:

- Jenkins is running correctly on the server
- GitHub webhook triggered the pipeline
- Java process executed the Jenkins WAR file
- Pipeline initialization completed successfully

Purpose:

To prove that the CI/CD pipeline is active and responding to GitHub push events.

Verifying SSL Certificate and Private Key on the Production Server



```
ubuntu@ip-172-31-31-222:~$ sudo ls -l /etc/ssl/certs/mycert.crt
sudo ls -l /etc/ssl/private/mykey.key
-rw-r--r-- 1 root root 1448 Nov 23 03:17 /etc/ssl/certs/mycert.crt
-rw------- 1 root root 1708 Nov 23 03:11 /etc/ssl/private/mykey.key
ubuntu@ip-172-31-31-222:~$
```

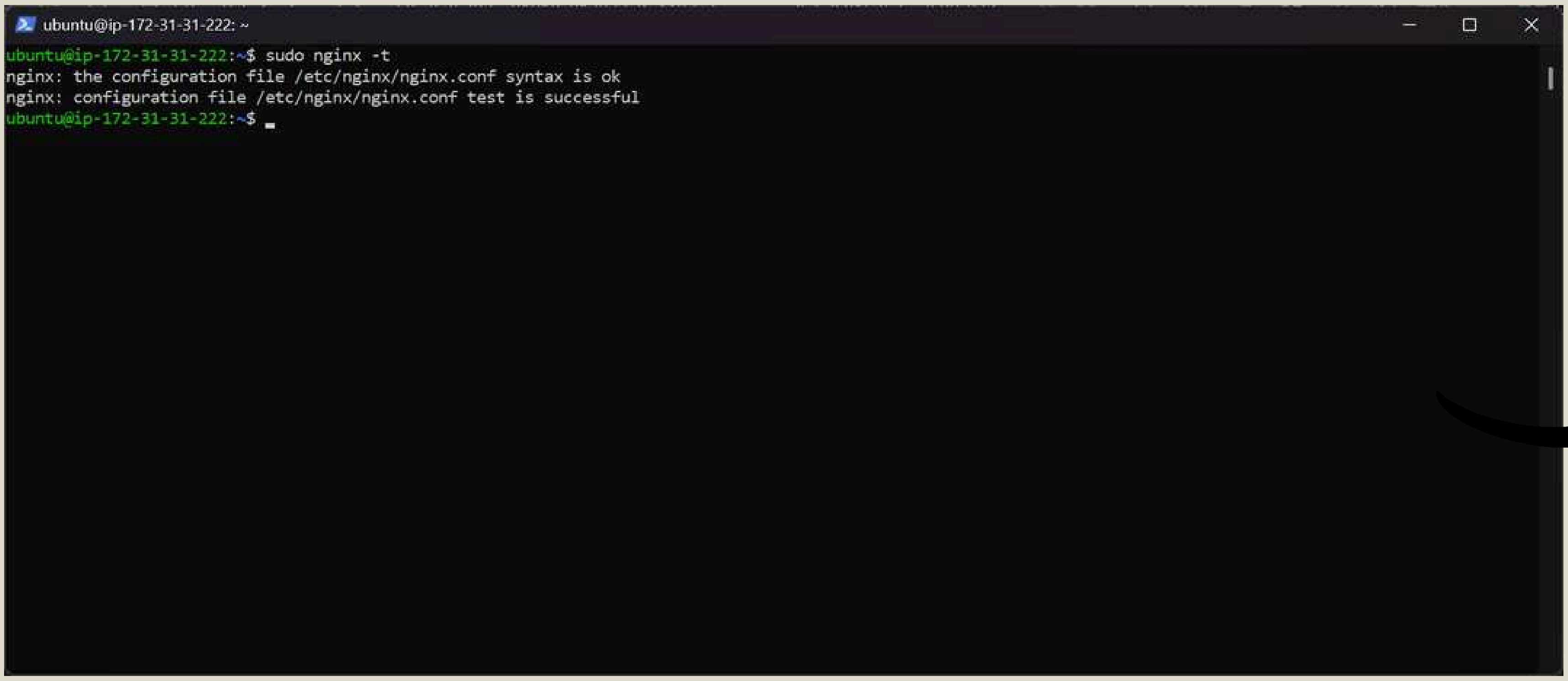
Here I validated the existence and correct permissions of:

- /etc/ssl/certs/mycert.crt
- /etc/ssl/private/mykey.key

This step is essential for enabling HTTPS for Nginx.

Correct permissions ensure that Nginx can read the certificate and private key safely.

Testing Nginx Configuration Before Deployment



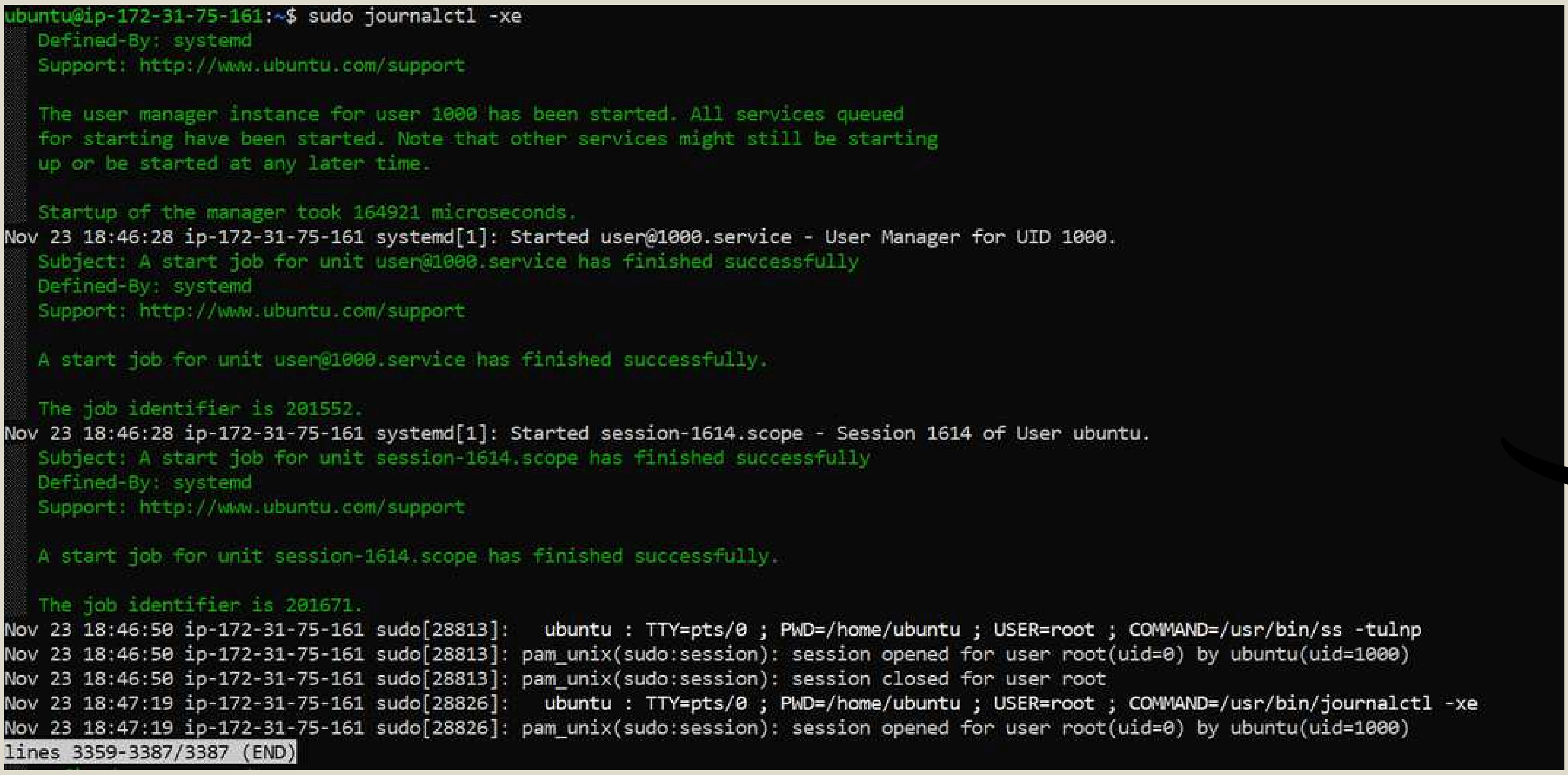
```
ubuntu@ip-172-31-31-222:~$ sudo nginx -t
nginx: the configuration file /etc/nginx/nginx.conf syntax is ok
nginx: configuration file /etc/nginx/nginx.conf test is successful
ubuntu@ip-172-31-31-222:~$ _
```

Running confirms that the configuration file is valid:sudo nginx -t

- Syntax OK
- Configuration test successful

This avoids breaking the production web server after reloading Nginx.

Systemd Journal Monitoring During Deployment



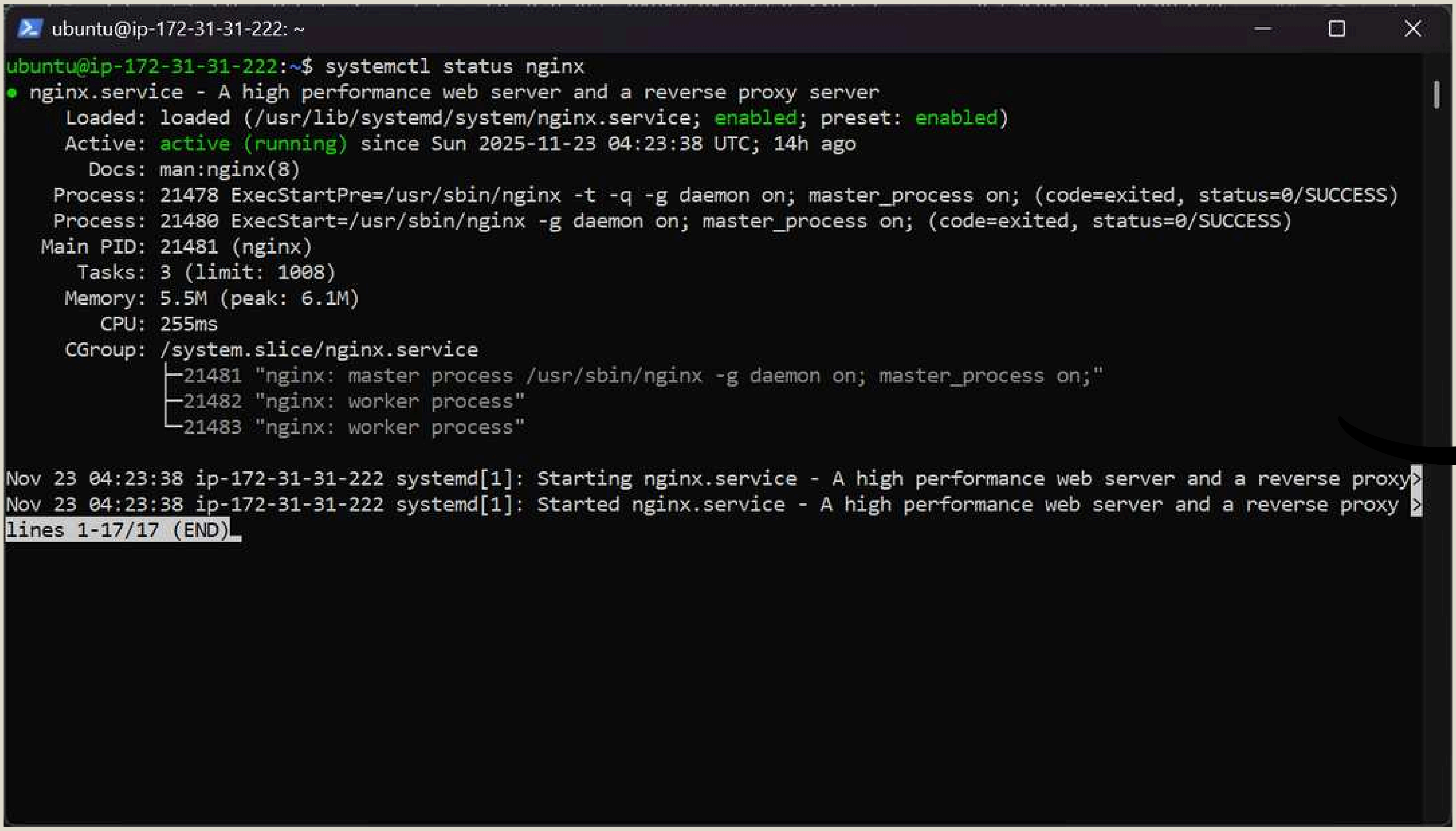
```
ubuntu@ip-172-31-75-161:~$ sudo journalctl -xe
    Defined-By: systemd
    Support: http://www.ubuntu.com/support

    The user manager instance for user 1000 has been started. All services queued
    for starting have been started. Note that other services might still be starting
    up or be started at any later time.

    Startup of the manager took 164921 microseconds.
Nov 23 18:46:28 ip-172-31-75-161 systemd[1]: Started user@1000.service - User Manager for UID 1000.
    Subject: A start job for unit user@1000.service has finished successfully
    Defined-By: systemd
    Support: http://www.ubuntu.com/support

    A start job for unit user@1000.service has finished successfully.

    The job identifier is 201552.
Nov 23 18:46:28 ip-172-31-75-161 systemd[1]: Started session-1614.scope - Session 1614 of User ubuntu.
    Subject: A start job for unit session-1614.scope has finished successfully
    Defined-By: systemd
    Support: http://www.ubuntu.com/support

    A start job for unit session-1614.scope has finished successfully.

    The job identifier is 201671.
Nov 23 18:46:50 ip-172-31-75-161 sudo[28813]:   ubuntu : TTY=pts/0 ; PWD=/home/ubuntu ; USER=root ; COMMAND=/usr/bin/ss -tulnp
Nov 23 18:46:50 ip-172-31-75-161 sudo[28813]: pam_unix(sudo:session): session opened for user root(uid=0) by ubuntu(uid=1000)
Nov 23 18:46:50 ip-172-31-75-161 sudo[28813]: pam_unix(sudo:session): session closed for user root
Nov 23 18:47:19 ip-172-31-75-161 sudo[28826]:   ubuntu : TTY=pts/0 ; PWD=/home/ubuntu ; USER=root ; COMMAND=/usr/bin/journalctl -xe
Nov 23 18:47:19 ip-172-31-75-161 sudo[28826]: pam_unix(sudo:session): session opened for user root(uid=0) by ubuntu(uid=1000)
lines 3359-3387/3387 (END)
```

Using to monitor system logs during deployment:journalctl -xe

- Ensures no background errors
- Confirms Nginx & Jenkins operations
- Helps detect permission or network issues

This step is part of safe deployment validation.

Nginx Running Successfully — Web Server Ready



```
ubuntu@ip-172-31-31-222:~$ 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 Sun 2025-11-23 04:23:38 UTC; 14h ago
       Docs: man:nginx(8)
    Process: 21478 ExecStartPre=/usr/sbin/nginx -t -q -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
    Process: 21480 ExecStart=/usr/sbin/nginx -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
   Main PID: 21481 (nginx)
      Tasks: 3 (limit: 1008)
     Memory: 5.5M (peak: 6.1M)
        CPU: 255ms
     CGroup: /system.slice/nginx.service
             ├─21481 "nginx: master process /usr/sbin/nginx -g daemon on; master_process on;"
             ├─21482 "nginx: worker process"
             └─21483 "nginx: worker process"

Nov 23 04:23:38 ip-172-31-31-222 systemd[1]: Starting nginx.service - A high performance web server and a reverse proxy>
Nov 23 04:23:38 ip-172-31-31-222 systemd[1]: Started nginx.service - A high performance web server and a reverse proxy >
lines 1-17/17 (END)
```

This screenshot confirms that the Nginx service is:

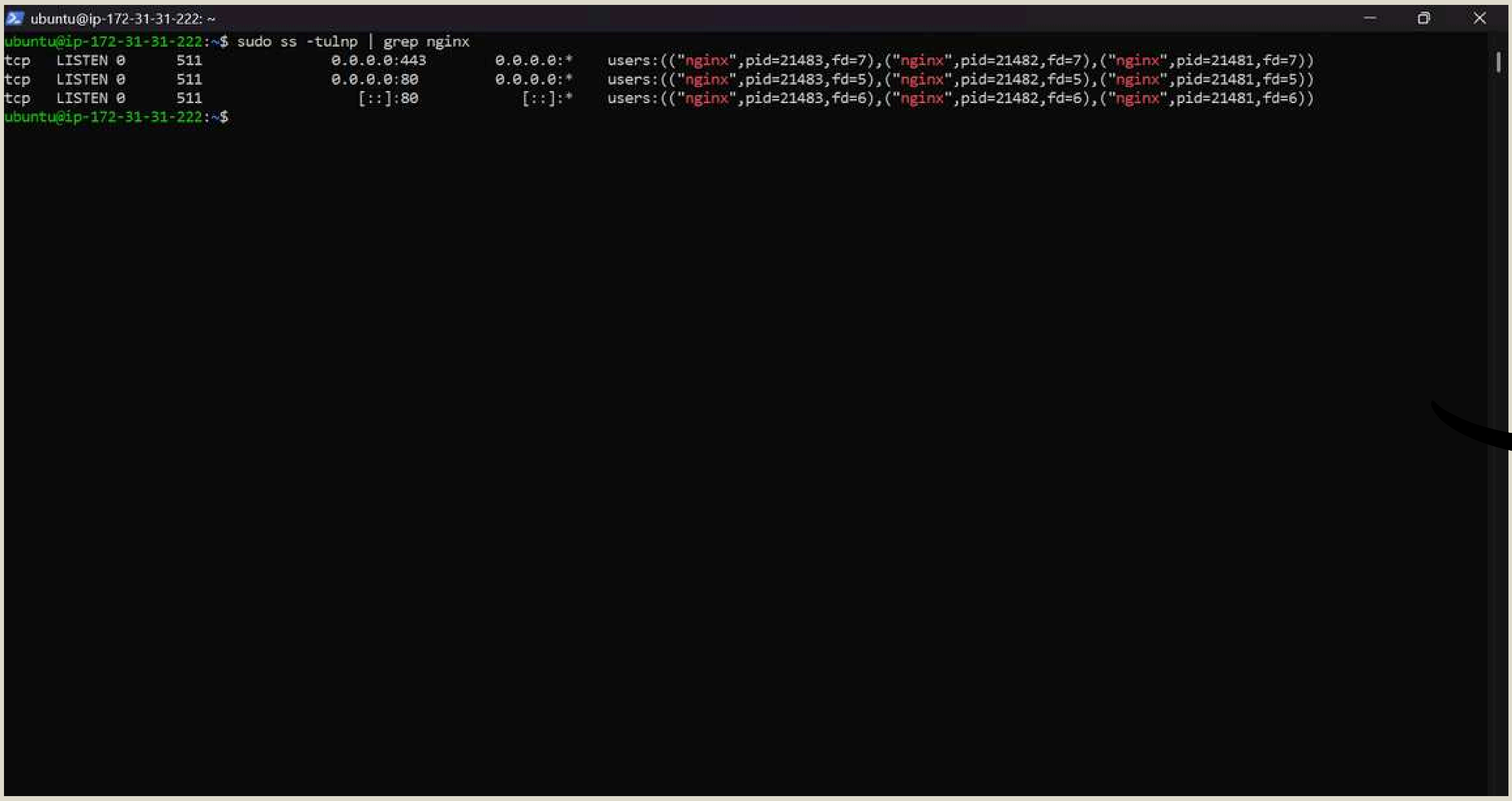
- Active (running)
- Loaded with no errors
- Worker processes functioning

This ensures the production web server is ready to handle traffic.

Nginx HTTPS & Reverse Proxy Ports

NGINX

Nginx Listening on Ports 80 & 443 (Reverse Proxy Ready)

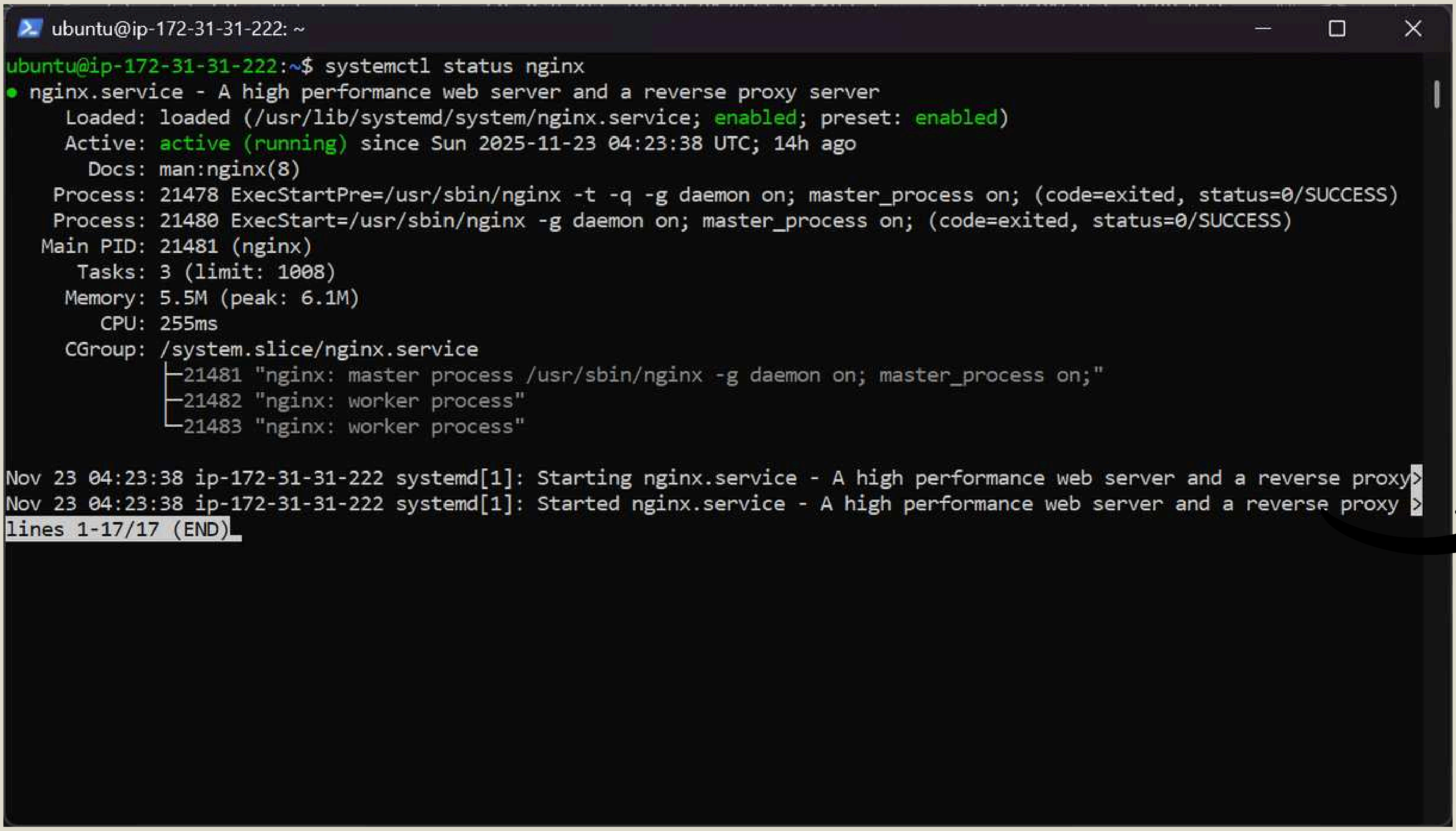


```
ubuntu@ip-172-31-31-222:~$ sudo ss -tulnp | grep nginx
tcp   LISTEN 0      511               0.0.0.0:443        0.0.0.0:*    users:(("nginx",pid=21483,fd=7),("nginx",pid=21482,fd=7),("nginx",pid=21481,fd=7))
tcp   LISTEN 0      511               0.0.0.0:80         0.0.0.0:*    users:(("nginx",pid=21483,fd=5),("nginx",pid=21482,fd=5),("nginx",pid=21481,fd=5))
tcp   LISTEN 0      511                  [::]:80            [::]:*    users:(("nginx",pid=21483,fd=6),("nginx",pid=21482,fd=6),("nginx",pid=21481,fd=6))
ubuntu@ip-172-31-31-222:~$
```

This command verifies that Nginx is correctly listening on HTTP (80) and HTTPS (443).

Presence of multiple worker processes confirms that the Nginx reverse proxy is active and ready to serve traffic.

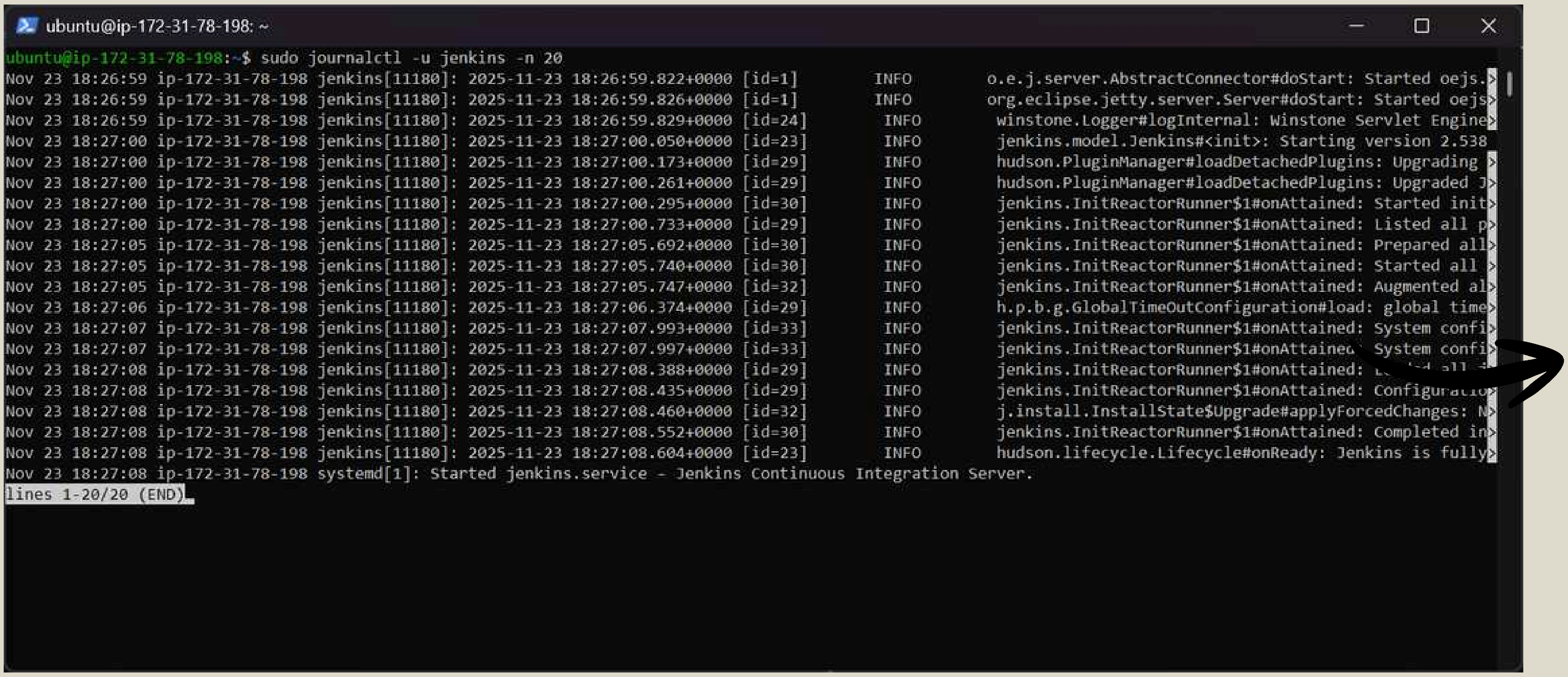
Verifying the Deployed Web Application Container



```
ubuntu@ip-172-31-31-222:~$ 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 Sun 2025-11-23 04:23:38 UTC; 14h ago
       Docs: man:nginx(8)
    Process: 21478 ExecStartPre=/usr/sbin/nginx -t -q -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
    Process: 21480 ExecStart=/usr/sbin/nginx -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
   Main PID: 21481 (nginx)
      Tasks: 3 (limit: 1008)
     Memory: 5.5M (peak: 6.1M)
        CPU: 255ms
     CGroup: /system.slice/nginx.service
             ├─21481 "nginx: master process /usr/sbin/nginx -g daemon on; master_process on;"
             ├─21482 "nginx: worker process"
             └─21483 "nginx: worker process"

Nov 23 04:23:38 ip-172-31-31-222 systemd[1]: Starting nginx.service - A high performance web server and a reverse proxy>
Nov 23 04:23:38 ip-172-31-31-222 systemd[1]: Started nginx.service - A high performance web server and a reverse proxy >
lines 1-17/17 (END)
```

This command lists all Docker containers.
It shows that the mysite container was successfully created and mapped to port 80, confirming that the app image was built and deployed during the CI/CD pipeline.

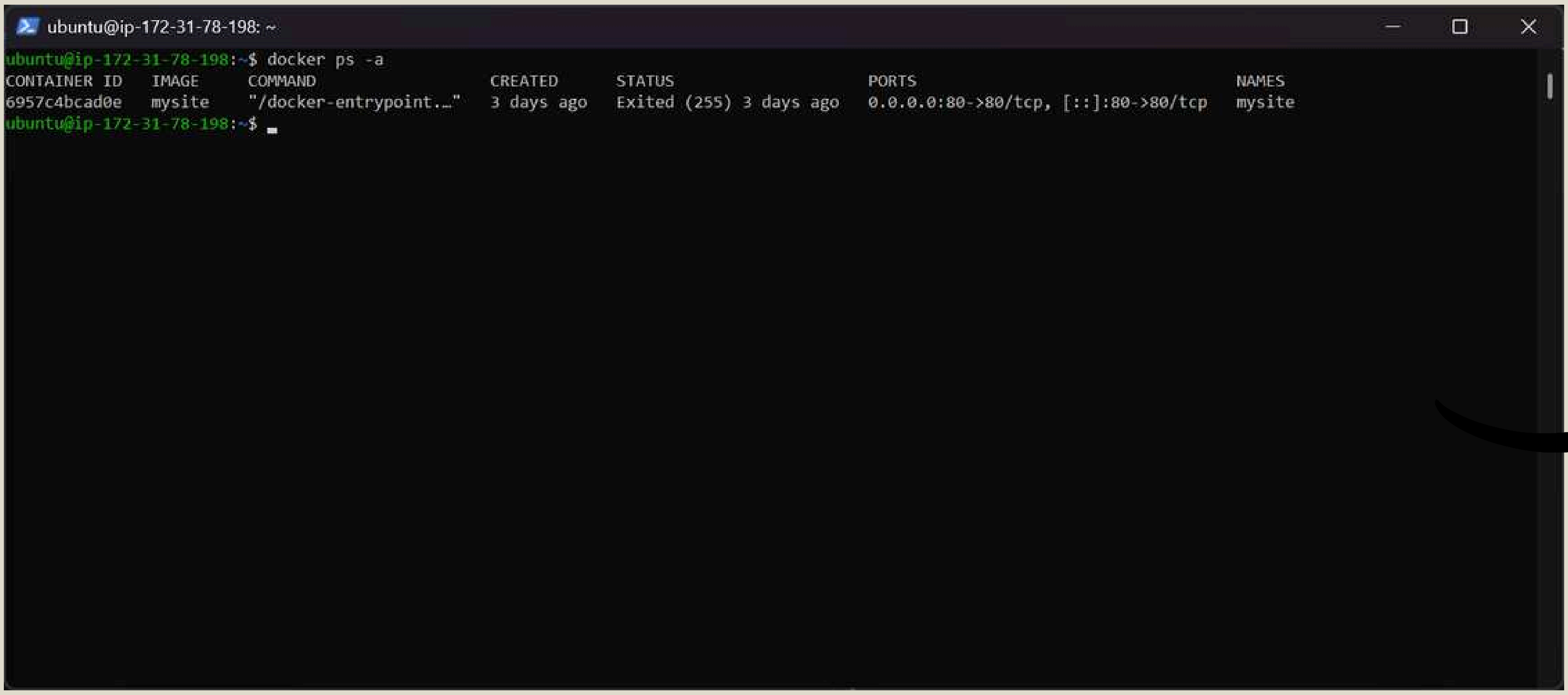
Jenkins Pipeline Started Successfully (Java Service Active)



```
ubuntu@ip-172-31-78-198:~$ sudo journalctl -u jenkins -n 20
Nov 23 18:26:59 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:26:59.822+0000 [id=1]       INFO       o.e.j.server.AbstractConnector#doStart: Started oejs.>
Nov 23 18:26:59 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:26:59.826+0000 [id=1]       INFO       org.eclipse.jetty.server.Server#doStart: Started oejs>
Nov 23 18:26:59 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:26:59.829+0000 [id=24]       INFO       winstone.Logger#logInternal: Winstone Servlet Engine>
Nov 23 18:27:00 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:00.050+0000 [id=23]       INFO       jenkins.model.Jenkins#<init>: Starting version 2.538
Nov 23 18:27:00 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:00.173+0000 [id=29]       INFO       hudson.PluginManager#loadDetachedPlugins: Upgrading >
Nov 23 18:27:00 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:00.261+0000 [id=29]       INFO       hudson.PluginManager#loadDetachedPlugins: Upgraded J>
Nov 23 18:27:00 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:00.295+0000 [id=30]       INFO       jenkins.InitReactorRunner$1#onAttained: Started init>
Nov 23 18:27:00 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:00.733+0000 [id=29]       INFO       jenkins.InitReactorRunner$1#onAttained: Listed all p>
Nov 23 18:27:05 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:05.692+0000 [id=30]       INFO       jenkins.InitReactorRunner$1#onAttained: Prepared all>
Nov 23 18:27:05 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:05.740+0000 [id=30]       INFO       jenkins.InitReactorRunner$1#onAttained: Started all >
Nov 23 18:27:05 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:05.747+0000 [id=32]       INFO       jenkins.InitReactorRunner$1#onAttained: Augmented al>
Nov 23 18:27:06 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:06.374+0000 [id=29]       INFO       h.p.b.g.GlobalTimeOutConfiguration#load: global time>
Nov 23 18:27:07 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:07.993+0000 [id=33]       INFO       jenkins.InitReactorRunner$1#onAttained: System confi>
Nov 23 18:27:07 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:07.997+0000 [id=33]       INFO       jenkins.InitReactorRunner$1#onAttained: System confi>
Nov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.388+0000 [id=29]       INFO       jenkins.InitReactorRunner$1#onAttained: Loaded all j>
Nov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.435+0000 [id=29]       INFO       jenkins.InitReactorRunner$1#onAttained: Configuratio>
Nov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.460+0000 [id=32]       INFO       j.install.InstallState$Upgrade#applyForcedChanges: N>
Nov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.552+0000 [id=30]       INFO       jenkins.InitReactorRunner$1#onAttained: Completed in>
Nov 23 18:27:08 ip-172-31-78-198 jenkins[11180]: 2025-11-23 18:27:08.604+0000 [id=23]       INFO       hudson.lifecycle.Lifecycle#onReady: Jenkins is fully>
Nov 23 18:27:08 ip-172-31-78-198 systemd[1]: Started jenkins.service - Jenkins Continuous Integration Server.
lines 1-20/20 (END)
```

These logs confirm that Jenkins is running on Java and the CI pipeline was triggered.
 Jenkins plugins, build steps, and initialization sequence all executed successfully — meaning that GitHub webhook integration is working.

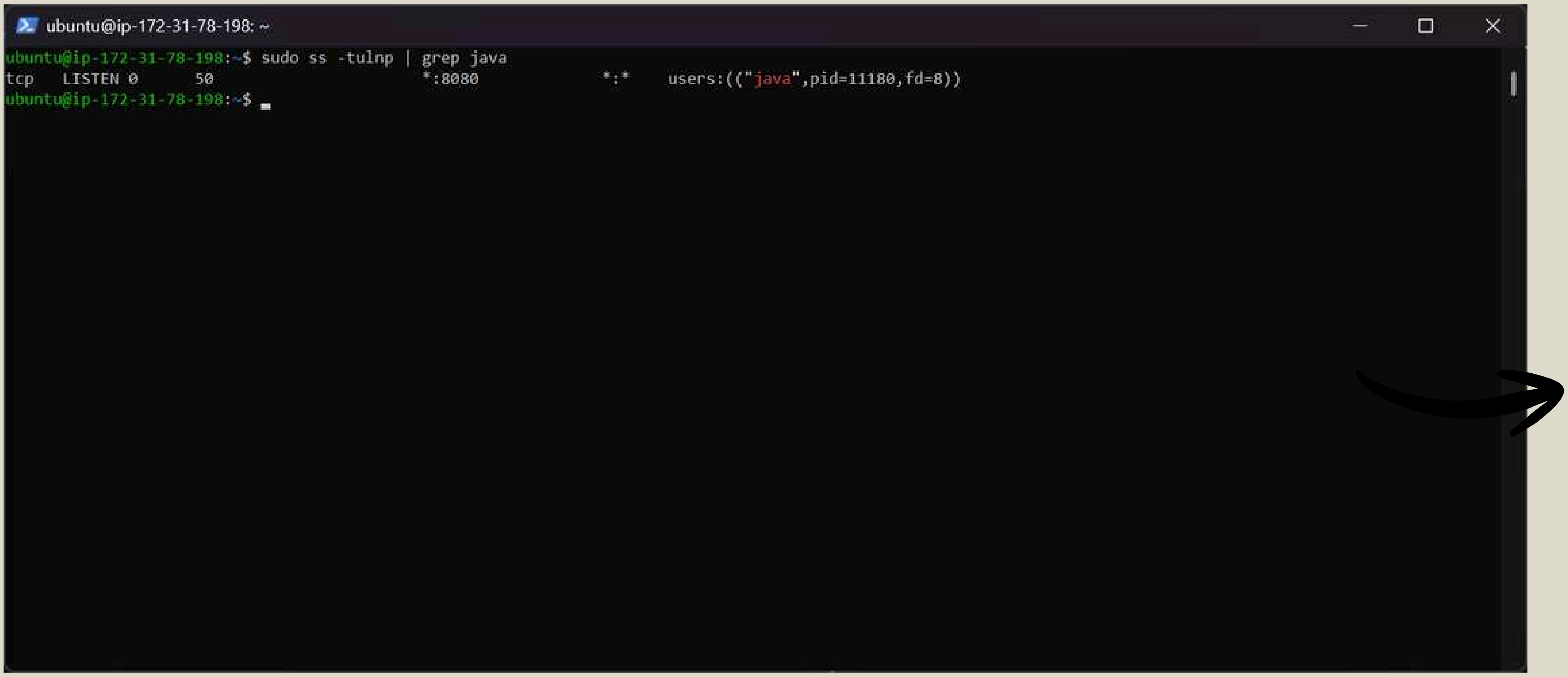
Validating Nginx Configuration Syntax



```
ubuntu@ip-172-31-78-198:~$ docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED      STATUS                     PORTS                                   NAMES
6957c4bcad0e   mysite    "/docker-entrypoint.…"   3 days ago   Exited (255) 3 days ago    0.0.0.0:80->80/tcp, [::]:80->80/tcp     mysite
ubuntu@ip-172-31-78-198:~$ 
```

The systemd status confirms that Nginx is enabled, active, and running without errors.
 This validates that the configuration is stable and serving as the main HTTPS reverse proxy

Nginx Reverse Proxy Running Successfully

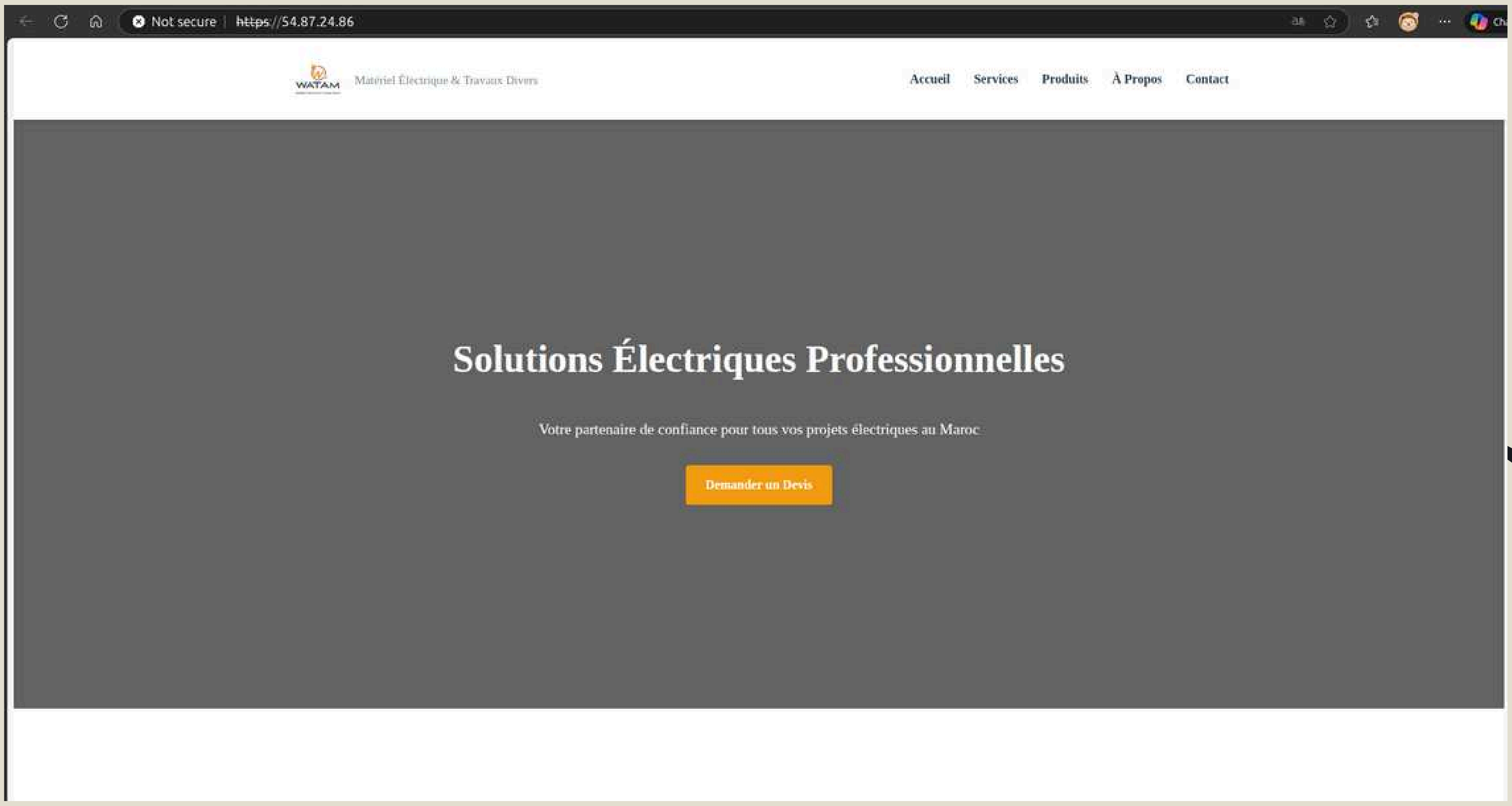


```
ubuntu@ip-172-31-78-198:~$ sudo ss -tulnp | grep java
tcp   LISTEN 0      50                      *:8080              *:*    users:(("java",pid=11180,fd=8))
ubuntu@ip-172-31-78-198:~$ 
```

Executing nginx -t ensures the Nginx configuration file has no syntax errors.
 The “test is successful” confirmation means the server is ready to reload or restart safely

Result

HTTPS
https://54.87.24.86/



Not secure | ~~https~~://54.87.24.86

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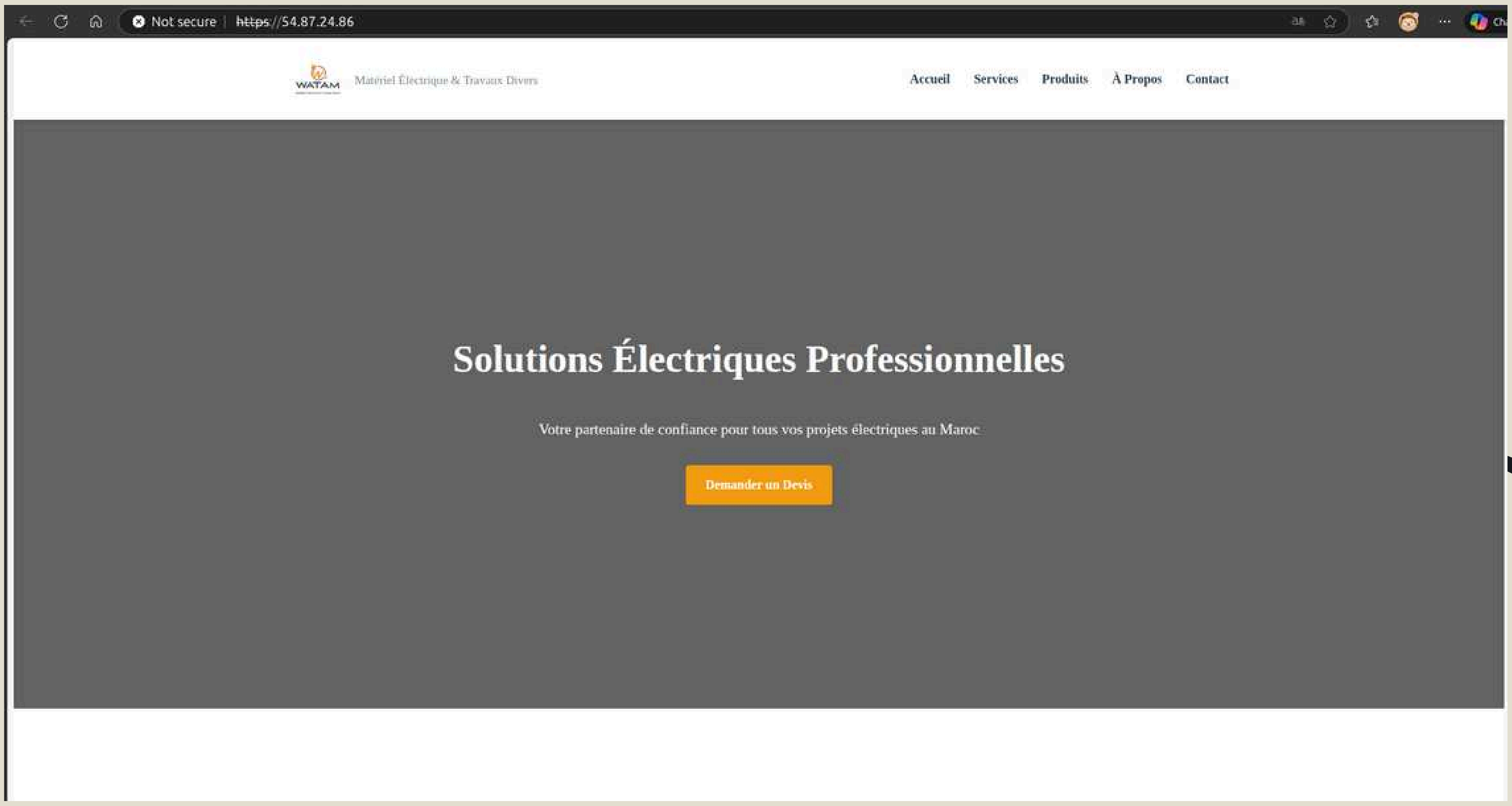
HTTP
http://54.87.24.86/


Not secure | ~~https~~://54.87.24.86
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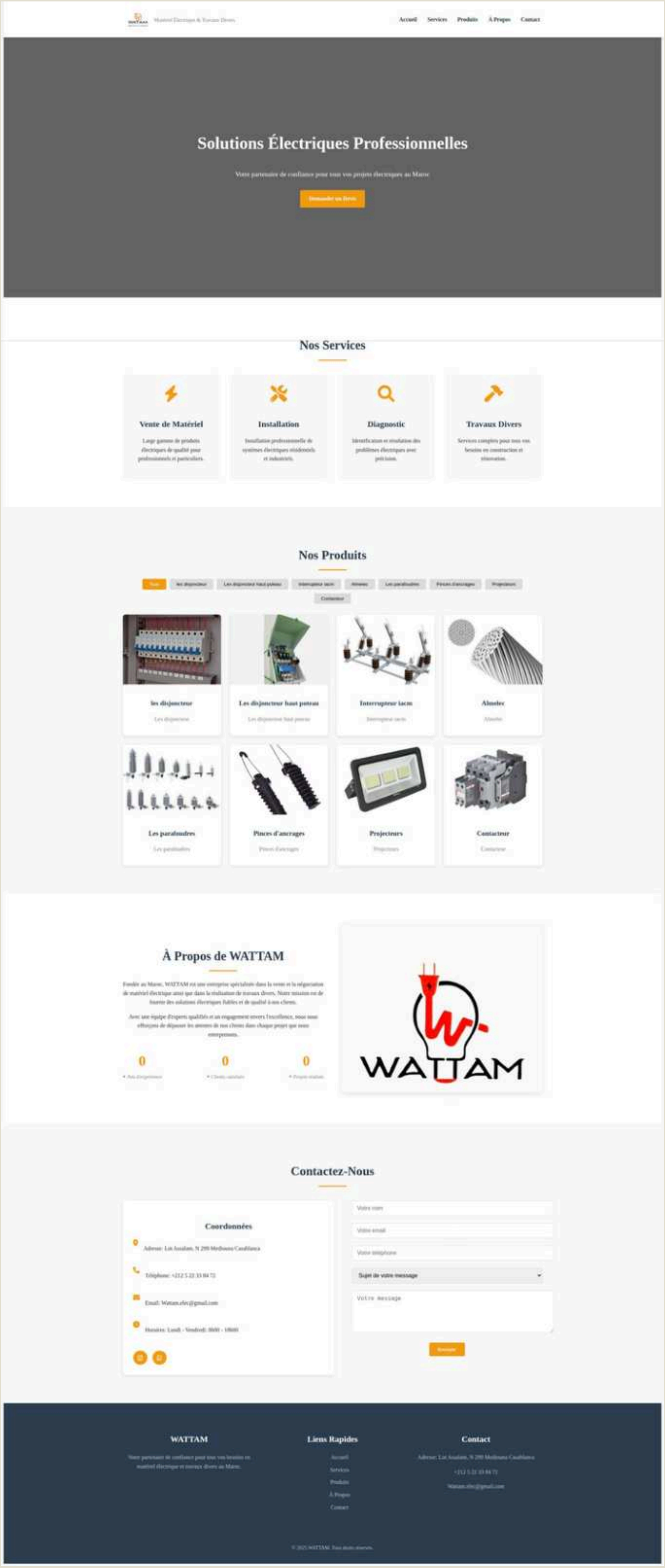

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Les disjoncteur haut poteau

Interrupteur iacm
Interrupteur iacm

Almelec
Almelec

Les parafoudres
Les parafoudres

Pinces d'ancrages
Pinces d'ancrages

Projecteurs
Projecteurs

Contacteur
Contacteur

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Sujet de votre message

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Wattam.elec@gmail.com

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Conclusion & Next Steps

This first DevOps project allowed me to build a complete CI/CD pipeline on AWS using Jenkins, Docker, Nginx, HTTPS, and automated deployment workflows.

I learned how to structure cloud environments, secure them, and design pipelines that reflect real industry practices.

Moving forward, I will expand this project with:

- Infrastructure as Code (Terraform)
- Automated SSL certificate renewal
- Full monitoring & alerting (Prometheus / Grafana)
- Blue/Green or Rolling deployment strategy
- A more advanced application with Front-End + Back-End
- A fully container-based architecture (Docker Compose / Kubernetes)

This project marks the beginning of my DevOps journey, and the next versions will be more complete, scalable, and production-ready.