

CLOUD COMPUTING LAB



SUBMITTED TO
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BSE V-A

Lab 14 – Terraform + Ansible: Dynamic Inventory, Roles & Automated Nginx/PHP & Docker Deployment

Task 0 – Lab Setup (Codespace & GH CLI)

- task0_codespace_open.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ gh codespace ssh -c refactored-acorn-x5gwq9w4qvr6c9p6j
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-1030-azure x86_64)

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

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $
```

- task0_env_check.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ aws --version
aws-cli/2.32.7 Python/3.12.12 Linux/6.8.0-1030-azure source/x86_64.alpine.3
@hajrasarwar22 →/workspaces/CC-HajraSarwar-022 (main) $ terraform --version
Terraform v1.7.0
on linux_amd64

Your version of Terraform is out of date! The latest version
is 1.14.4. You can update by downloading from https://www.terraform.io/downloads.html
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ansible --version || echo "ansible
ot yet installed"
ansible [core 2.20.0]
  config file = None
  configured module search path = ['/home/vscode/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3.12/site-packages/ansible
  ansible collection location = /home/vscode/.ansible/collections:/usr/share/ansible/collecti
  ons
  executable location = /usr/bin/ansible
  python version = 3.12.12 (main, Oct 11 2025, 01:16:26) [GCC 15.2.0] (/usr/bin/python3)
  jinja version = 3.1.6
  pyyaml version = 6.0.3 (with libyaml v0.2.5)
```

- task0_aws_config.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ aws sts get-caller-identity
{
  "UserId": "AIDAX4WZI3P6I7RQDIYI",
  "Account": "542622959327",
  "Arn": "arn:aws:iam::542622959327:user/MyUser_CLI"
}
```

Task 1 – Generate SSH key & Initial Terraform

- task1_ssh_keygen_before.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ls ~/.ssh
bash: task: command not found
```

- task1_ssh_keygen.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ssh-keygen -t ed25519 -f ~/ssh/id_ed25519 -N ""
Generating public/private ed25519 key pair.
/home/codespace/.ssh/id_ed25519 already exists.
Overwrite (y/n)? y
Your identification has been saved in /home/codespace/.ssh/id_ed25519
Your public key has been saved in /home/codespace/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:Hfx9oADM89vBLTPuAnBIJf2e237uZ1FXxELpRnH1iVc codespace@codespaces-79bf37
The key's randomart image is:
+--[ED25519 256]--+
|       .=o   ..o=E|
|       ...=. . .=0*|
|       . . +o. =0++|
|       o ..oo*.=.=+|
|       oS..=.* +|
|       . + o  . |
|       . +     .|
|       o o . o|
|       o.+oo |
+----[SHA256]-----+
```

- task1_ssh_keygen_after.png

```
[...]
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ls -la ~/ssh
total 32
drwx----- 2 codespace codespace 4096 Jan 30 15:24 .
drwxr-x--- 1 codespace codespace 4096 Jan 30 21:28 ..
```

- task1_terraform_tfvars_created.png

```
vpc_cidr_block = "10.0.0.0/16"
subnet_cidr_block = "10.0.10.0/24"
availability_zone = "me-central-1a"
env_prefix = "dev"
instance_type = "t3.micro"
public_key = "~/ssh/id_ed25519.pub"
private_key = "~/ssh/id_ed25519"
```

- task1_terraform_init.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ terraform init  
selections it made above. Include this file in your version control repository  
so that Terraform can guarantee to make the same selections by default when  
you run "terraform init" in the future.
```

```
Terraform has been successfully initialized!
```

```
You may now begin working with Terraform. Try running "terraform plan" to see  
any changes that are required for your infrastructure. All Terraform commands  
should now work.
```

```
If you ever set or change modules or backend configuration for Terraform,  
rerun this command to reinitialize your working directory. If you forget, other  
commands will detect it and remind you to do so if necessary.
```

- task1_terraform_apply_2_instances.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ terraform apply -auto-approve  
Apply complete! Resources: 10 added, 0 changed, 0 destroyed.  
  
Outputs:  
  
webserver_public_ips = [  
    "3.28.74.36",  
    "158.252.33.79",  
]
```

- task1_terraform_output_ips.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ terraform output  
webserver_public_ips = [  
    "3.28.74.36",  
    "158.252.33.79",  
]
```

Task 2 – Static ansible inventory with 2 instances

- task2_ansible_install.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ansible --version  
ansible [core 2.20.0]  
  config file = None  
  configured module search path = ['/home/vscode/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']  
  ansible python module location = /usr/lib/python3.12/site-packages/ansible  
  ansible collection location = /home/vscode/.ansible/collections:/usr/share/ansible/collections  
  executable location = /usr/bin/ansible  
  python version = 3.12.12 (main, Oct 11 2025, 01:16:26) [GCC 15.2.0] (/usr/bin/python3)  
  jinja version = 3.1.6  
  pyyaml version = 6.0.3 (with libyaml v0.2.5)
```

- task2_terraform_output_ips.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ terraform output  
webserver_public_ips = [  
    "3.28.74.36",  
    "158.252.33.79",  
]
```

- task2_hosts_created.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ touch hosts  
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ls -ls hosts  
0 -rw-rw-rw- 1 codespace codespace 0 Jan 30 21:42 hosts
```

- task2_ansible_ping_initial.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ 20.92.21.55   ansible_us  
er=ec2-user      ansible_ssh_private_key_file=~/.ssh/id_ed25519  
158.252.33.79 | SUCCESS => {  
    "ansible_facts": {  
        "discovered_interpreter_python": "/usr/bin/python3.9"  
    },  
    "changed": false,  
    "ping": "pong"  
}  
[WARNING]: Host '3.28.74.36' is using the discovered Python interpreter at '/usr/bin/python3.9',  
t future installation of another Python interpreter could cause a different interpreter to be di  
vered. See https://docs.ansible.com/ansible-core/2.20/reference_appendices/interpreter_discovery  
ml for more information.  
3.28.74.36 | SUCCESS => {  
    "ansible_facts": {  
        "discovered_interpreter_python": "/usr/bin/python3.9"  
    },  
    "changed": false,  
    "ping": "pong"  
}
```

- task2_hosts_with_common_args.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ansible_ssh_common_args=  
'-o StrictHostKeyChecking=no'  
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $
```

- task2_ansible_ping_success.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ansible all -i hosts -m ping  
.html for more information.  
158.252.33.79 | SUCCESS => {  
    "ansible_facts": {  
        "discovered_interpreter_python": "/usr/bin/python3.9"  
    },  
    "changed": false,  
    "ping": "pong"  
}  
[WARNING]: Host '3.28.74.36' is using the discovered Python interpreter at '/usr/bin/python3.9',  
t future installation of another Python interpreter could cause a different interpreter to be di  
vered. See https://docs.ansible.com/ansible-core/2.20/reference_appendices/interpreter_discovery  
ml for more information.  
3.28.74.36 | SUCCESS => {  
    "ansible_facts": {  
        "discovered_interpreter_python": "/usr/bin/python3.9"  
    },  
    "changed": false,  
    "ping": "pong"  
}
```

Task 3 – Scale to 3 instances & group based inventory

- task3_terraform_apply_3_instances.png

```
@HamnaMahmood20 ➔ /workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ terraform apply -auto-approve
Apply complete! Resources: 3 added, 0 changed, 0 destroyed.

Outputs:

webserver_public_ips = [
  "3.28.74.36",
  "158.252.33.79",
  "40.172.100.131",
]
```

- task3_terraform_output_3_ips.png

```
@HamnaMahmood20 ➔ /workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ terraform output
webserver_public_ips = [
  "3.28.74.36",
  "158.252.33.79",
  "40.172.100.131",
]
```

- task3_ansible_single_ip_ping.png

```
@HamnaMahmood20 ➔ /workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ansible ec2 -i hosts -m ping
3.28.74.36 | SUCCESS => {
  "ansible_facts": {
    "discovered_interpreter_python": "/usr/bin/python3.9"
  },
  "changed": false,
  "ping": "pong"
}
[WARNING]: Host '158.252.33.79' is using the discovered Python interpreter at '/usr/bin/python3.9', but future installation of another Python interpreter could cause a different interpreter to be discovered. See https://docs.ansible.com/ansible-core/2.20/reference_appendices/interpreter_discovery.html for more information.
158.252.33.79 | SUCCESS => {
  "ansible_facts": {
    "discovered_interpreter_python": "/usr/bin/python3.9"
  },
  "changed": false,
  "ping": "pong"
}
```

- task3_ansible_droplet_ping.png

```
@HamnaMahmood20 ➔ /workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ansible droplet -i hosts -m ping
40.172.100.131 | SUCCESS => {
  "ansible_facts": {
    "discovered_interpreter_python": "/usr/bin/python3.9"
  },
  "changed": false,
  "ping": "pong"
}
```

- task3_ansible_all_ping.png

```

@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ansible all -i hosts -m ping
g
158.252.33.79 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}
[WARNING]: Host '40.172.100.131' is using the discovered Python interpreter at '/usr/bin/python3.9', but future installation of another Python interpreter could cause a different interpreter to be discovered. See https://docs.ansible.com/ansible-core/2.20/reference_appendices/interpreter_discovery.html for more information.
40.172.100.131 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}
[WARNING]: Host '3.28.74.36' is using the discovered Python interpreter at '/usr/bin/python3.9', but future installation of another Python interpreter could cause a different interpreter to be discovered. See https://docs.ansible.com/ansible-core/2.20/reference_appendices/interpreter_discovery.html for more information.
3.28.74.36 | SUCCESS => {
    "ansible_facts": {

```

Task 4 – Global Ansible.cfg & first nginx playbook

- task4_global_ansible_cfg.png

```

[default]
host_key_checking = False
interpreter_python = /usr/bin/python3
~
~
```

- task4_my_playbook_created.png

```

@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ touch my-playbook.yml
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ls -la my-playbook.yml
-rw-rw-rw- 1 codespace codespace 0 Jan 30 22:02 my-playbook.yml
```

- task4_ansible_play_ec2.png

```

@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ansible-playbook -i hosts my-playbook.yaml
TASK [install nginx and update cache] ****
changed: [3.28.74.36]
changed: [158.252.33.79]

TASK [start nginx server] ****
changed: [158.252.33.79]
changed: [3.28.74.36]

PLAY RECAP ****
158.252.33.79 : ok=3    changed=2    unreachable=0    failed=0    skipped=0    resc
ued=0  ignored=0
3.28.74.36 : ok=3    changed=2    unreachable=0    failed=0    skipped=0    resc
ued=0  ignored=0
```

- task4_nginx_browser_ec2.png



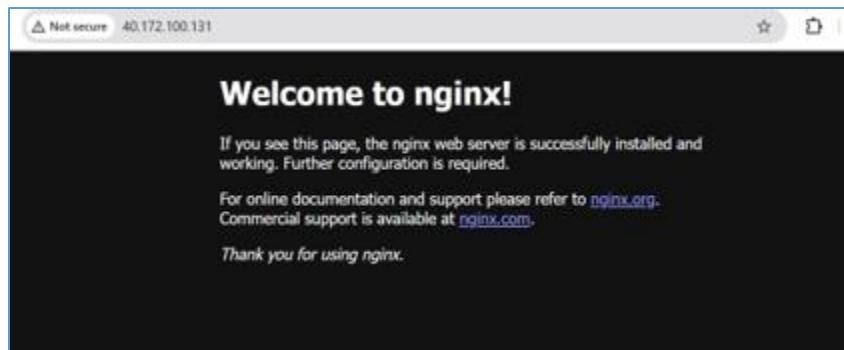
- task4_my_playbook_droplet.png

```
@HamnaMahmood20 → /workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ansible-playbook -i hosts my-playbook.yaml
TASK [install nginx and update cache] ****
changed: [3.28.74.36]
changed: [158.252.33.79]

TASK [start nginx server] ****
changed: [158.252.33.79]
changed: [3.28.74.36]

PLAY RECAP ****
158.252.33.79 : ok=3    changed=2    unreachable=0   failed=0    skipped=0    rescued=0    ignored=0
```

- task4_nginx_browser_droplet.png



Task 5- Single Nginx Target Group

- task5_project_ansible_cfg_created.png

```
@HamnaMahmood20 → /workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ touch ansible.cfg
@HamnaMahmood20 → /workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ls -ls ansible.cfg
0 -rw-rw-rw- 1 codespace codespace 0 Jan 30 22:10 ansible.cfg
```

- task5_project_ansible_cfg.png

```
lab_14 > Task > ansible.cfg
1  [defaults]
2  host_key_checking=False
3  interpreter_python = /usr/bin/python3
```

- task5_main_tf_count_1.png

```
lab_14 > Task > main.tf
23: module "myapp-webserver" {
30:   vpc_id = aws_vpc.myapp_vpc.id
31:   subnet_id = module.myapp-subnet.subnet.id
32:
33:   # Loop count
34:   count      = 1
35:   # Use count.index to differentiate instances
36:   instance_suffix = count.index
```

- task5_terraform_output_single_ip.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ terraform apply -auto-approve
Apply complete! Resources: 0 added, 0 changed, 6 destroyed.
```

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ terraform output
webserver_public_ips = [
  "3.28.74.36",
]
```

- task5_my_playbook_nginx_group.png

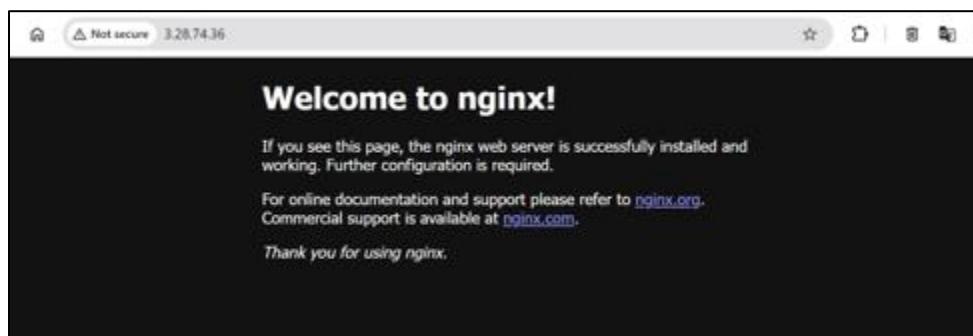
```
Task > ! my-playbook.yaml
---
- name: Configure nginx web server
  hosts: nginx
  become: true
  tasks:
    - name: install nginx and update cache
      yum:
        name: nginx
```

- task5_ansible_play_nginx_group.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ ansible-playbook -i hosts my-playbook.yaml
changed: [3.28.74.36]

PLAY RECAP ****
3.28.74.36 : ok=4    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

- task5_nginx_browser_single.png



Task 6- Ansible Managed SSL

- task6_my_playbook_ssl_section.png

```
- name: Configure nginx web server  
  
- name: Configure SSL certificates  
  hosts: nginx  
  become: true  
  tasks:  
    - name: Create SSL private directory  
      file:  
        path: /etc/ssl/private  
        state: directory  
        mode: '0700'  
  
    - name: Create SSL certs directory  
      file:
```

- task6_ansible_play_ssl.png

```
@HannaMahmood20 ~/workspaces/CC-Hanna-Mahmood-25-BSE-VA (main) $ ansible-playbook -i hosts my-playbook.yaml  
TASK [Get IMDSv2 token] ****  
ok: [3.28.74.36]  
  
TASK [Get current public IP] ****  
ok: [3.28.74.36]  
  
TASK [Show current public IP] ****  
ok: [3.28.74.36] => {  
  "msg": "Public IP: 3.28.74.36"  
}  
  
TASK [Generate self-signed SSL certificate] ****  
changed: [3.28.74.36]  
  
PLAY RECAP ****  
3.28.74.36 : ok=11  changed=3  unreachable=0  failed=0  skipped=0  rescued=0  ignored=0
```

- task6_ssl_cert_file.png

```
@HannaMahmood20 ~/workspaces/CC-Hanna-Mahmood-25-BSE-VA (main) $ ssh ec2-user@3.28.74.36 -i ~/.ssh/id_ed25519  
-----BEGIN CERTIFICATE-----  
MIIDOTCCAiGgAwIBAgIUiDhsr1NBx7xjvonqcIFzoyCz+nIowDQYJKoZIhvcNAQEL  
BQAwFTETMBEGA1UEAwwKMy4y0C43NC4zNjAeFw0yNjAxMjgxOTA3MzBaFw0yNzAx  
MjgxOTA3MzBaMBUxEzARBgNVBAMCjMuMjguNzQuMzYwggEiMA0GCSqGSIb3DQEBr  
AQAA4IBDwAwggEKAoIBAQCYSo/3Yf87MvBGbnA8pN/FuyxitkkiCD6bhY5WVOA  
AwVvKrPH28TBs3PDD2aREM7yWi5hqZMUfdWxkT9GDznEK9dBedHCGmXiGtvoHGH  
RNQwlfcWfRdBwz9gHdvQw5W0uWpyobK+hkB8/mfElGiTr1hrX/cYBsyJrVA2Q2Ts  
-----END CERTIFICATE-----
```

- task6_ssl_key_file.png

```
[ec2-user@ip-10-0-10-145 ~]$ sudo cat /etc/ssl/private/selfsigned.key  
-----BEGIN PRIVATE KEY-----  
MIIEvgIBADANBgkqhkiG9w0BAQEFAASCBKgwggSkAgEAAoIBAQCYSo/3Yf87MvB  
GbnA8pN/FuyxitkkiCD6bhY5WVOAAwVvKrPH28TBs3PDD2aREM7yWi5hqZMUfdW  
xkT9GDznEK9dBedHCGmXiGtvoHGRNQwlfcWfRdBwz9gHdvQw5W0uWpyobK+hkB8
```

Task 7 – PHP Frontend Deployment with Templates

- task7_files_templates_created.png

```
@HannaMahmood20 → /workspaces/CC-Hanna-Mahmood-25-BSE-VA/lab_14/Task (main) $ mkdir -p files/templates
@HannaMahmood20 → /workspaces/CC-Hanna-Mahmood-25-BSE-VA/lab_14/Task (main) $ touch files/index.php
@HannaMahmood20 → /workspaces/CC-Hanna-Mahmood-25-BSE-VA/lab_14/Task (main) $ touch templates/nginx.conf.j2
@HannaMahmood20 → /workspaces/CC-Hanna-Mahmood-25-BSE-VA/lab_14/Task (main) $ ls -R
.:
ansible.cfg  locals.tf  my-playbook.yaml  terraform.tfstate      variables.tf
files         main.tf    outputs.tf       terraform.tfstate.backup
hosts         modules   templates        terraform.tfvars

./files:
index.php

./modules:
subnet  webserver

./modules/subnet:
main.tf  outputs.tf  variables.tf

./modules/webserver:
main.tf  outputs.tf  variables.tf

./templates:
nginx.conf.j2
```

- task7_my_playbook_web_deploy.png

```
- name: Configure SSL certificates
  tasks:

- name: Deploy Nginx website and configuration files
  hosts: nginx
  become: true
  tasks:
    - name: install php-fpm and php-curl
      yum:
        name:
          - php-fpm
          - php-curl
```

- task7_ansible_play_web_deploy.png

```
@HannaMahmood20 → /workspaces/CC-Hanna-Mahmood-25-BSE-VA/lab_14/Task (main) $ ansible-playbook -i hosts my-playbook.yaml
...
TASK [install php-fpm and php-curl] ****
ok: [3.28.74.36]

TASK [Copy website files] ****
ok: [3.28.74.36]

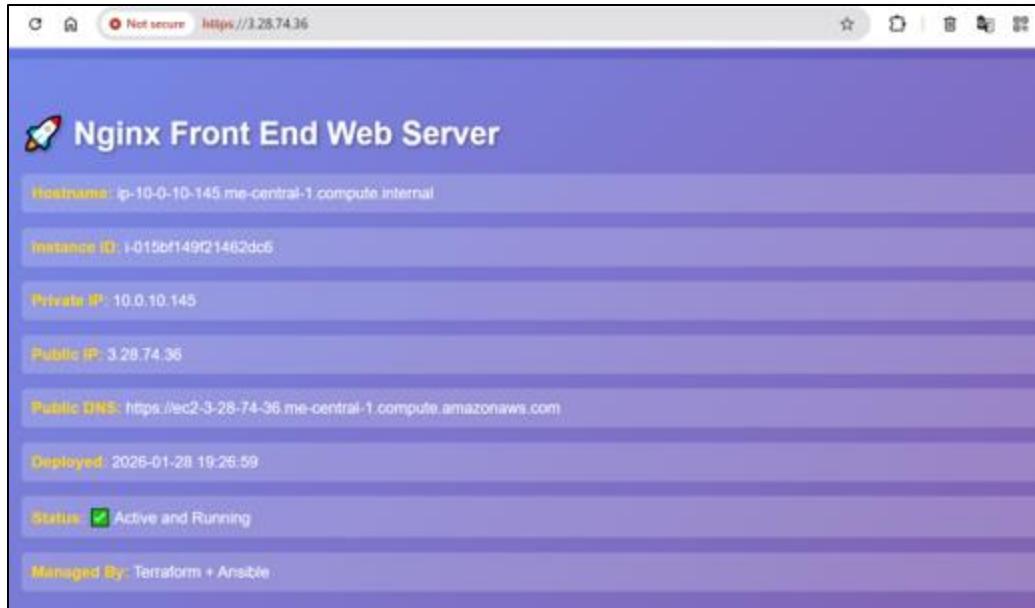
TASK [Copy nginx.conf template] ****
changed: [3.28.74.36]

TASK [Restart nginx] ****
changed: [3.28.74.36]

TASK [Start and enable php-fpm] ****
changed: [3.28.74.36]

PLAY RECAP ****
3.28.74.36 : ok=19  changed=3  unreachable=0  failed=0  skipped=8  rescued=0  ignored=0
```

- task7_php_https_browser.png



Task 8 – Docker & Docker Compose

- task8_terraform_apply_docker_instance.png

```
@HannaMahmood20 ➔ /workspaces/CC-Hanna-Mahmood-25-BSE-VA/lab_14/Task (main) $ terraform apply -auto-approve
Apply complete! Resources: 7 added, 0 changed, 0 destroyed.
```

- task8_terraform_output_new_ip.png

```
@HannaMahmood20 ➔ /workspaces/CC-Hanna-Mahmood-25-BSE-VA/lab_14/Task (main) $ terraform output
webserver_public_ips = [
  "40.172.234.49",
```

- task8_hosts_docker_servers.png

```
[docker_servers]
40.172.234.49

[docker_servers:vars]
ansible_ssh_private_key_file=~/ssh/id_ed25519
ansible_user=ec2-user
```

- task8_my_playbook_docker.png

```
---
- name: Configure Docker
  hosts: all
  become: true
  tasks:
    - name: install docker and update cache
      yum:
```

- task8_ansible_play_docker.png

```
@HamnaMahmood20 ~ /workspaces/CC-Hamna-Mahmood-25-BSE-VA/lab_14/Task (main) $ ansible-playbook -i hosts my-playbook.yaml
TASK [restart docker service] ****
changed: [40.172.234.49]

PLAY RECAP ****
40.172.234.49 : ok=8    changed=4    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

- task8_docker_ps_remote.png

```
@HamnaMahmood20 ~ /workspaces/CC-Hamna-Mahmood-25-BSE-VA/lab_14/Task (main) $ ssh ec2-user@40.172.234.49 -i ./ssh/id_ed25519
** The server may need to be upgraded. See https://openssh.com/pq.html
,
#_
~\_ #####_ Amazon Linux 2023
~~ \#####\
~~ \###|
~~ \#/ ___ https://aws.amazon.com/linux/amazon-linux-2023
~~ V~' '-->
~~ /
~~ _/
~~ _/
~~ _/
/m/'
```

Last login: Wed Jan 28 19:37:09 2026 from 4.240.39.194

```
[ec2-user@ip-10-0-10-136 ~]$ sudo docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
[ec2-user@ip-10-0-10-136 ~]$ exit
logout
```

Task 9 – Gitea Docker

- task9_my_playbook_add_user_to_docker.png

```
lab_14 > Task > ! my-playbook.yaml
12   - name: Install Docker Compose
16     tasks:
41
42   - name: Adding user to docker group
43     hosts: all
44     become: true
45     vars_files:
46       - project-vars.yaml
47     tasks:
48       - name: add user to docker group
49         user:
```

- task9_my_playbook_deploy_containers.png

```
lab_14 > Task > ! my-playbook.yaml
42   - name: Adding user to docker group
43     tasks:
44       - name: fail if docker is not accessible
45
46
47   - name: Deploy Docker Containers
48     hosts: all
49     become: true
50     user: "{{ normal_user }}"
51     vars_files:
52       - project-vars.yaml
53     tasks:
54       - name: check if docker-compose file exists
```

- task9_compose_yaml.png

```
Task > compose.yaml
services:
  gitea:
    image: gitea/gitea:latest
    container_name: gitea
    environment:
      - DB_TYPE=postgres
      - DB_HOST=db:5432
      - DB_NAME=gitea
      - DB_USER=gitea
```

- task9_ansible_play_gitea.png

```
@HamnaMahmood20 ~ /workspaces/CC-Hamna-Mahmood-25-BSE-VA/lab_14/Task (main) $ ansible-playbook -i hosts
y-playbook.yaml
PLAY RECAP ****
40.172.234.49 : ok=16    changed=2    unreachable=0    failed=0    skipped=1    resc
ued=0    ignored=0
```

- task9_sg_ingress_3000.png

```
4 > Task > modules > webserver > main.tf
resource "aws_security_group" "web_sg" {
  ingress {
  }
  ingress {
    from_port    = 3000
    to_port      = 3000
    protocol     = "tcp"
    cidr_blocks = ["0.0.0.0/0"]
```

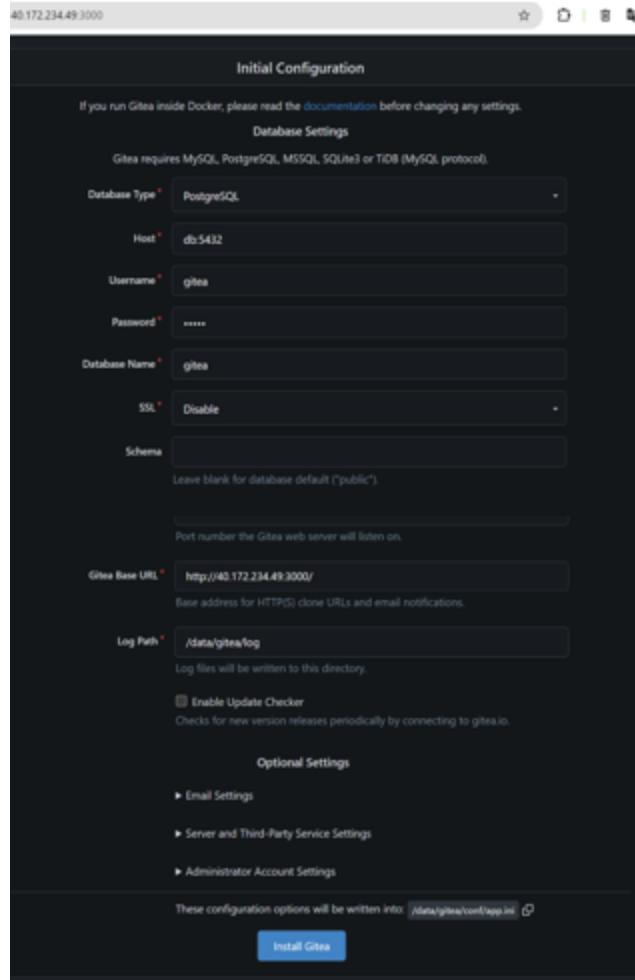
- task9_terraform_apply_sg_3000.png

```
@HamnaMahmood20 ~ /workspaces/CC-Hamna-Mahmood-25-BSE-VA/lab_14/Task (main) $ terraform apply -auto-appro
ve
Apply complete! Resources: 0 added, 1 changed, 0 destroyed.

Outputs:

webserver_public_ips = [
  "40.172.234.49",
]
```

- task9_gitea_browser.png



Task 10 – Automating Ansible

- task10_null_resource_main_tf.png

```
resource "null_resource" "configure_server" {
  triggers = [
    webserver_public_ips_for_ansible = join(",", [for i in module.myapp-webserver : 
  ])

  depends_on = [module.myapp-webserver]

  provisioner "local-exec" {
    command = <<-EOT

```

- task10_terraform_destroy_before_null.png

```
@HamnaMahmood20 ~>/workspaces/CC-Hamna-Mahmood-25-BSE-VA/lab_14/Task (main) $ terraform destroy -auto-apply
aws_vpc.myapp_vpc: Destruction complete after 1s

Destroy complete! Resources: 7 destroyed.
```

- task10_terraform_apply_with_local_exec.png

```
@HannaMahmood20 ➔ /workspaces/CC-Hanna-Mahmood-25-BSE-VA/lab_14/Task (main) $ terraform apply -auto-approve
Apply complete! Resources: 8 added, 0 changed, 0 destroyed.

Outputs:

webserver_public_ips = [
  "158.252.83.213",
]
```