
LAB 14

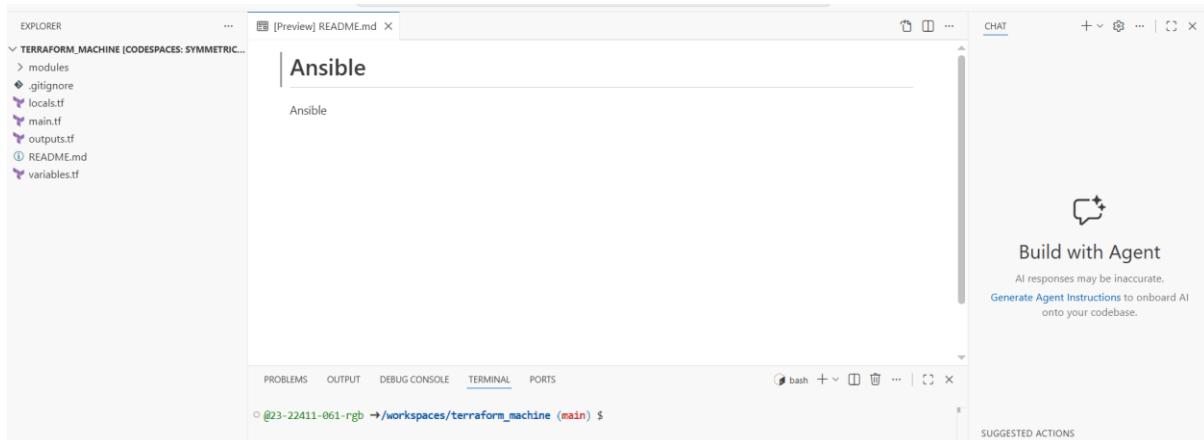
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LAB TASK

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

Task 0 – Lab Setup (Codespace & GH CLI)

task0_codespace_open



task0_env_check

```
@23-22411-061-rgb → /workspaces/terraform_machine (main) $ sudo ./aws/install
You can now run: /usr/local/bin/aws --version
@23-22411-061-rgb → /workspaces/terraform_machine (main) $ aws --version
aws-cli/2.32.32 Python/3.13.11 Linux/6.8.0-1030-azure exe/x86_64/ubuntu.24
@23-22411-061-rgb → /workspaces/terraform_machine (main) $ █
```

```
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  terraform
0 upgraded, 1 newly installed, 0 to remove and 55 not upgraded.
Need to get 30.6 MB of archives.
After this operation, 101 MB of additional disk space will be used.
Get:1 https://apt.releases.hashicorp.com noble/main amd64 terraform amd64 1.14.3-1 [30.6 MB]
Fetched 30.6 MB in 0s (146 MB/s)
Selecting previously unselected package terraform.
(Reading database ... 58629 files and directories currently installed.)
Preparing to unpack .../terraform_1.14.3-1_amd64.deb ...
Unpacking terraform (1.14.3-1) ...
Setting up terraform (1.14.3-1) ...
@23-22411-061-rgb →/workspaces/terraform_machine (main) $ terraform --version
Terraform v1.14.3
on linux_amd64
@23-22411-061-rgb →/workspaces/terraform_machine (main) $ 
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ansible --version
ansible [core 2.16.3]
  config file = None
  configured module search path = ['/home/codespace/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  ansible collection location = /home/codespace/.ansible/collections:/usr/share/ansible/collections
  executable location = /usr/bin/ansible
  python version = 3.12.3 (main, Nov  6 2025, 13:44:16) [GCC 13.3.0] (/usr/bin/python3)
  jinja version = 3.1.6
  libyaml = True
○ @23-22411-061-rgb →/workspaces/terraform_machine (main) $ 
```

task0_aws_config

```
default output format: json
@23-22411-061-rgb →/workspaces/terraform_machine (main) $ aws sts get-caller-identity
{
    "UserId": "AIDARC5V6TLZ6QC4LSNWL",
    "Account": "075006647027",
    "Arn": "arn:aws:iam::075006647027:user/ec2"
}
```

Task 1 – Generate ssh key and Initial Terraform apply

task1_ssh_keygen_before

```
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ mkdir -p ~/.ssh
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ls ~/.ssh
```

task1_ssh_keygen

```
▶ @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ssh-keygen -t ed25519 -f ~/.ssh/id_ed25519 -N ""  
Generating public/private ed25519 key pair.  
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:dJBe7/TINhiSc80oCZn8xdBRVWR64ELaTludhrAxzUo codespace@codespaces-b8870c  
The key's randomart image is:  
+--[ED25519 256]--+  
| . oo=.*=.oo+|  
| = ..=E=+.=.|  
| +.=+=*.+oo|  
| .O.++=+..|  
| S= *oo |  
| . * . |  
| . . |  
+---[SHA256]-----+
```

task1_ssh_keygen_after Ansible

The screenshot shows a terminal window with several command-line sessions. The first session at the top is a manual ssh-keygen command. Below it, a series of Ansible tasks are listed, each starting with a blue dot. These tasks include creating an ssh directory, listing files in it, generating an ed25519 key pair, and finally listing the contents of the ssh directory again. The terminal interface includes tabs for PROBLEMS, OUTPUT, DEBUG CONSOLE, TERMINAL (which is selected), and PORTS. The bottom of the terminal shows a file browser with a file named 'terraform.tfvars'.

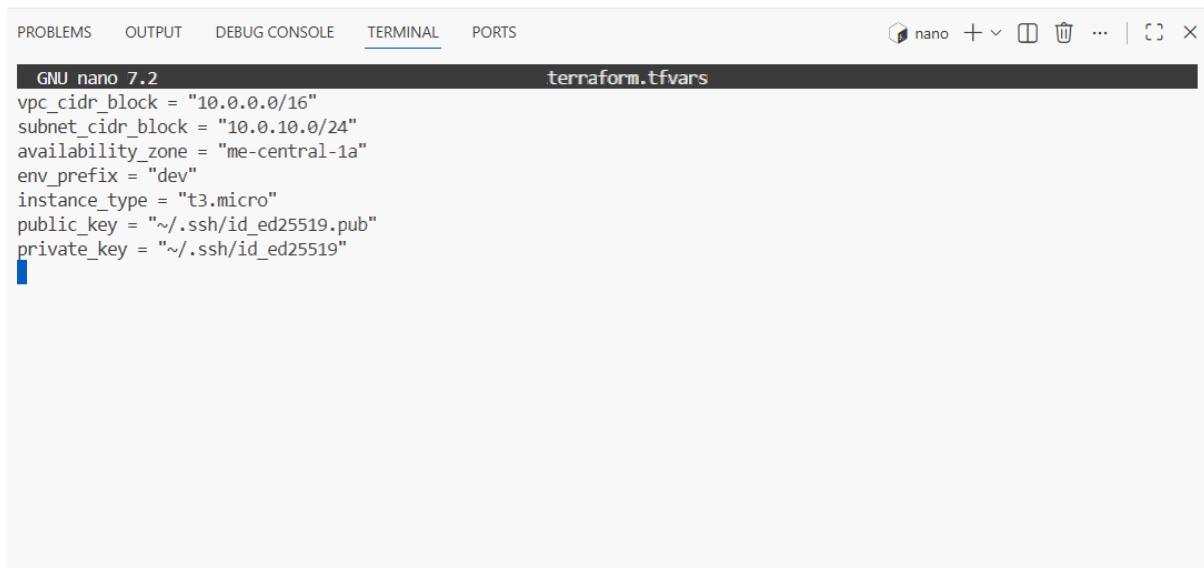
```
@23-22411-061-rgb →/workspaces/terraform_machine (main) $ aws sts get-caller-identity  
◎ @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ls ~/.ssh  
ls: cannot access '/home/codespace/.ssh': No such file or directory  
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ mkdir -p ~/.ssh  
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ls ~/.ssh  
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ssh-keygen -t ed25519 -f ~/.ssh/id_ed25519 -N ""  
Generating public/private ed25519 key pair.  
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:dJBe7/TINhiSc80oCZn8xdBRVWR64ELaTludhrAxzUo codespace@codespaces-b8870c  
The key's randomart image is:  
+--[ED25519 256]--+  
| . oo=.*=.oo+|  
| = ..=E=+.=.|  
| +.=+=*.+oo|  
| .O.++=+..|  
| S= *oo |  
| . * . |  
| . . |  
+---[SHA256]-----  
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ls -la ~/.ssh  
total 20  
drwxr-xr-x 2 codespace codespace 4096 Jan 10 07:25 .  
drwxr-x--- 1 codespace codespace 4096 Jan 10 07:24 ..  
-rw----- 1 codespace codespace 419 Jan 10 07:25 id_ed25519  
-rw-r--r-- 1 codespace codespace 109 Jan 10 07:25 id_ed25519.pub  
○ @23-22411-061-rgb →/workspaces/terraform_machine (main) $
```

task1_terraform_tfvars_created

```
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ cd /workspaces/terraform_machine  
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ touch terraform.tfvars  
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ls -la terraform.tfvars  
-rw-rw-rw- 1 codespace codespace 0 Jan 10 07:27 terraform.tfvars  
○ @23-22411-061-rgb →/workspaces/terraform_machine (main) $
```

task1_terraform_tfvars

Ansible



The screenshot shows a terminal window with the title bar "terminal". The file being edited is "terraform.tfvars". The content of the file is as follows:

```
GNU nano 7.2
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

```
● @23-22411-061-rgb → /workspaces/terratorm_machine (main) $ terraform init
Initializing the backend...
Initializing modules...
- myapp-subnet in modules/subnet
- myapp-webserver in modules/webserver
Initializing provider plugins...
- Finding latest version of hashicorp/aws...
- Finding latest version of hashicorp/http...
- Installing hashicorp/http v3.5.0...
- Installed hashicorp/http v3.5.0 (signed by HashiCorp)
- Installing hashicorp/aws v6.28.0...
- Installed hashicorp/aws v6.28.0 (signed by HashiCorp)
Terraform has created a lock file .terraform.lock.hcl to record the provider
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

```
module.myapp-webserver[0].aws_instance.myapp-server: Still creating... [00m10s elapsed]
module.myapp-webserver[1].aws_instance.myapp-server: Still creating... [00m10s elapsed]
module.myapp-webserver[0].aws_instance.myapp-server: Creation complete after 13s [id=i-0418ff678]
module.myapp-webserver[1].aws_instance.myapp-server: Creation complete after 13s [id=i-03994cf68]
```

Apply complete! Resources: 10 added, 0 changed, 0 destroyed.

Outputs:

```
webserver_public_ips = [
    "158.252.35.230",
    "40.172.88.106",
]
```

@23-22411-061-rgb → /workspaces/terraform_machine (main) \$

task1_terraform_output_ips

● @23-22411-061-rgb → /workspaces/terraform_machine (main) \$ terraform output
webserver_public_ips = [
 "158.252.35.230",
 "40.172.88.106",
]

○ @23-22411-061-rgb → /workspaces/terraform_machine (main) \$

Task 2 – Static Ansible inventory with two EC2 instances

task2_ansible_install

```
!@23-22411-061-rgb → /workspaces/terraform_machine (main) $ pipx install ansible-core
⚠ Note: ansible was already on your PATH at /usr/bin/ansible
⚠ Note: ansible-config was already on your PATH at /usr/bin/ansible-config
⚠ Note: ansible-console was already on your PATH at /usr/bin/ansible-console
⚠ Note: ansible-doc was already on your PATH at /usr/bin/ansible-doc
⚠ Note: ansible-galaxy was already on your PATH at /usr/bin/ansible-galaxy
⚠ Note: ansible-inventory was already on your PATH at /usr/bin/ansible-inventory
⚠ Note: ansible-playbook was already on your PATH at /usr/bin/ansible-playbook
⚠ Note: ansible-pull was already on your PATH at /usr/bin/ansible-pull
⚠ Note: ansible-test was already on your PATH at /usr/bin/ansible-test
⚠ Note: ansible-vault was already on your PATH at /usr/bin/ansible-vault
installed package ansible-core 2.20.1, installed using Python 3.12.1
These apps are now globally available
  - ansible
  - ansible-config
  - ansible-console
  - ansible-doc
  - ansible-galaxy
  - ansible-inventory
  - ansible-playbook
  - ansible-pull
  - ansible-test
  - ansible-vault
done! 🎉🎉🎉
!@23-22411-061-rgb → /workspaces/terraform_machine (main) $ ansible --version
ansible [core 2.16.3]
  config file = None
  configured module search path = ['~/home/codespace/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  ansible collection location = /home/codespace/.ansible/collections:/usr/share/ansible/collections
  executable location = /usr/bin/ansible
  python version = 3.12.1 (main, Nov 6 2025, 13:44:16) [GCC 13.3.0] (/usr/bin/python3)
  jinja version = 3.1.6
  libyaml = True
!@23-22411-061-rgb → /workspaces/terraform_machine (main) $
```

task2_terraform_output_ips

```
● @23-22411-061-rgb → /workspaces/terraform_machine (main) $ terraform output
webserver_public_ips = [
  "158.252.35.230",
  "40.172.88.106",
]
```

task2_hosts_created

- @23-22411-061-rgb → /workspaces/terraform_machine (main) \$ touch hosts
- @23-22411-061-rgb → /workspaces/terraform_machine (main) \$ ls -la hosts
-rw-rw-rw- 1 codespace codespace 0 Jan 10 07:41 hosts
- @23-22411-061-rgb → /workspaces/terraform_machine (main) \$

task2_hosts_initial

```
GNU nano 7.2
hosts
40.172.88.106 ansible_user=ec2-user ansible_ssh_private_key_file=~/ssh/id_ed25519
158.252.35.230 ansible_user=ec2-user ansible_ssh_private_key_file=~/ssh/id_ed25519
```

task2_ansible_ping_initial

- @23-22411-057-sudo → /workspaces/terraform_machine (main) \$ ansible all -i hosts -m ping
[WARNING]: Platform linux on host 40.172.101.201 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of another Python interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.16/reference_appendices/interpreter_discovery.html for more information.
40.172.101.201 | SUCCESS => {
 "ansible_facts": {
 "discovered_interpreter_python": "/usr/bin/python3.9"
 },
 "changed": false,
 "ping": "pong"
}
[WARNING]: Platform linux on host 3.29.33.227 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of another Python interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.16/reference_appendices/interpreter_discovery.html for more information.
3.29.33.227 | SUCCESS => {
 "ansible_facts": {
 "discovered_interpreter_python": "/usr/bin/python3.9"
 },
 "changed": false,
 "ping": "pong"
}
- @23-22411-057-sudo → /workspaces/terraform_machine (main) \$

task2_hosts_with_common_args

```
GNU nano 7.2                                     hosts *
40.172.88.106 ansible_user=ec2-user ansible_ssh_private_key_file=~/ssh/id_ed25519 ansible_ssh_common_args=' -o StrictHostKeyChecking=no'
158.252.35.230 ansible_user=ec2-user ansible_ssh_private_key_file=~/ssh/id_ed25519 ansible_ssh_common_args=' -o StrictHostKeyChecking=no'
```

task2_ansible_ping_success

```
● @23-22411-061-rgb → /workspaces/terraform_machine (main) $ ansible all -i hosts -m ping
[WARNING]: Platform linux on host 40.172.88.106 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.16/reference_appendices/interpreter_discovery.html for more
information.
40.172.88.106 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}
[WARNING]: Platform linux on host 158.252.35.230 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.16/reference_appendices/interpreter_discovery.html for more
information.
158.252.35.230 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}
○ @23-22411-061-rgb → /workspaces/terraform_machine (main) $
```

Task 3 - Scale to three instances & group-based inventory

task3_main_tf_count_3

```
module "myapp-webserver" {
  source          = "./modules/webserver"
  env_prefix      = var.env_prefix
  instance_type   = var.instance_type
  availability_zone = var.availability_zone
  public_key      = var.public_key
  my_ip           = local.my_ip
  vpc_id          = aws_vpc.myapp_vpc.id
  subnet_id       = module.myapp-subnet.subnet.id

  # Loop count
  count           = 3
  # Use count.index to differentiate instances
  instance_suffix = count.index
}
```

task3_terraform_apply_3_instances

```
module.myapp-webserver[2].aws_instance.myapp-server: Still creating... [00m10s elapsed]
module.myapp-webserver[2].aws_instance.myapp-server: Still creating... [00m20s elapsed]
module.myapp-webserver[2].aws_instance.myapp-server: Creation complete after 24s [id=i-07798e1b6872c05d3]
```

```
Apply complete! Resources: 3 added, 0 changed, 0 destroyed.
```

Outputs:

```
webserver_public_ips = [
  "158.252.35.230",
  "40.172.88.106",
  "3.28.185.63",
]
@23-22411-061-rgb → /workspaces/terraform_machine (main) $ █
0 ↵ 0
```

task3_terraform_output_3_ips

```
module.myapp-webserver[2].aws_instance.myapp-server: Still creating... [00m10s elapsed]
module.myapp-webserver[2].aws_instance.myapp-server: Still creating... [00m20s elapsed]
module.myapp-webserver[2].aws_instance.myapp-server: Creation complete after 24s [id=i-07798e1b6872c05d3]
```

```
Apply complete! Resources: 3 added, 0 changed, 0 destroyed.
```

Outputs:

```
webserver_public_ips = [
  "158.252.35.230",
  "40.172.88.106",
  "3.28.185.63",
]
@23-22411-061-rgb → /workspaces/terraform_machine (main) $ █
0 ↵ 0
```

task3_hosts_grouped

[ec2]

```
40.172.88.106
158.252.35.230
```

[ec2:vars]

```
ansible_user=ec2-user
ansible_ssh_private_key_file=~/ssh/id_ed25519
ansible_ssh_common_args=' -o StrictHostKeyChecking=no'
```

[droplet]

```
3.28.185.63
```

[droplet:vars]

```
ansible_user=ec2-user
ansible_ssh_private_key_file=~/ssh/id_ed25519
ansible_ssh_common_args=' -o StrictHostKeyChecking=no'
```

task3_ansible_ec2_ping

```
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ansible ec2 -i hosts -m ping
[WARNING]: Platform linux on host 40.172.88.106 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.16/reference_appendices/interpreter_discovery.html for more
information.
40.172.88.106 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}
[WARNING]: Platform linux on host 158.252.35.230 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.16/reference_appendices/interpreter_discovery.html for more
information.
158.252.35.230 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}
```

task3_ansible_single_ip_ping

```
}
```

```
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ansible 158.252.35.230 -i hosts -m ping
[WARNING]: Platform linux on host 158.252.35.230 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.16/reference_appendices/interpreter_discovery.html for more
information.
158.252.35.230 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ █
```

task3_ansible_droplet_ping

```
}
```

```
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ansible droplet -i hosts -m ping
[WARNING]: Platform linux on host 3.28.185.63 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.16/reference_appendices/interpreter_discovery.html for more
information.
3.28.185.63 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}
```

task3_ansible_all_ping

```
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ansible all -i hosts -m ping
[WARNING]: Platform linux on host 40.172.88.106 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.16/reference_appendices/interpreter_discovery.html for more
information.
40.172.88.106 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}
[WARNING]: Platform linux on host 3.28.185.63 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.16/reference_appendices/interpreter_discovery.html for more
information.
3.28.185.63 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}
[WARNING]: Platform linux on host 158.252.35.230 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.16/reference_appendices/interpreter_discovery.html for more
information.
158.252.35.230 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ █
```

Task 4 – Global ansible.cfg & first nginx playbook

task4_global_ansible_cfg

The screenshot shows a terminal window with the following content:

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

task4_hosts_without_common_args

The screenshot shows a terminal window with the following content:

```
GNU nano 7.2                                     hosts
[ec2]
40.172.88.106
158.252.35.230

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

[droplet]
3.28.185.63

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

task4_ansible_ping_after_cfg

```

@23-22411-061-rgb →/workspaces/terraform_machine (main) $ ansible all -i hosts -m ping
[WARNING]: Platform linux on host 40.172.88.106 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.16/reference_appendices/interpreter_discovery.html for more
information.
40.172.88.106 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}
[WARNING]: Platform linux on host 3.28.185.63 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.16/reference_appendices/interpreter_discovery.html for more
information.
3.28.185.63 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}
[WARNING]: Platform linux on host 158.252.35.230 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.16/reference_appendices/interpreter_discovery.html for more
information.
158.252.35.230 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}

```

task4_my_playbook_created

```

● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ touch my-playbook.yaml
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ls -la my-playbook.yaml
-rw-rw-rw- 1 codespace codespace 0 Jan 10 08:11 my-playbook.yaml
○ @23-22411-061-rgb →/workspaces/terraform_machine (main) $

```

task4_my_playbook_ec2

```

GNU nano 7.2                                     my-playbook.yaml *
---
- name: Configure nginx web server
  hosts: ec2
  become: true
  tasks:
    - name: install nginx and update cache
      yum:
        name: nginx
        state: present
        update_cache: yes

    - name: start nginx server
      service:
        name: nginx
        state: started

```

task4_ansible_play_ec2

```

● @23-22411-061-rgb → /workspaces/terraform_machine (main) $ ansible-playbook -i hosts my-playbook.yaml

PLAY [Configure nginx web server] ****
TASK [Gathering Facts] ****
[WARNING]: Host '40.172.88.106' 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.
ok: [40.172.88.106]
[WARNING]: Host '158.252.35.230' 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.
ok: [158.252.35.230]

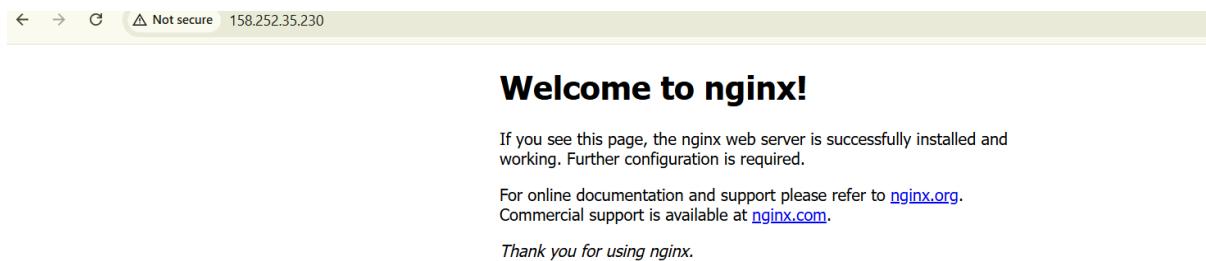
TASK [install nginx and update cache] ****
changed: [40.172.88.106]
changed: [158.252.35.230]

TASK [start nginx server] ****
changed: [158.252.35.230]
changed: [40.172.88.106]

PLAY RECAP ****
158.252.35.230 : ok=3    changed=2    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
40.172.88.106 : ok=3    changed=2    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

```

task4_nginx_browser_ec2



task4_my_playbook_droplet

```

GNU nano 7.2                               my-playbook.yaml
-----
- name: Configure nginx web server
  hosts: droplet
  become: true
  tasks:
    - name: install nginx and update cache
      yum:
        name: nginx
        state: present
        update_cache: yes

    - name: start nginx server
      service:
        name: nginx
        state: started

```

task4_ansible_play_droplet

```

● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ansible-playbook -i hosts my-playbook.yaml
PLAY [Configure nginx web server] ****
TASK [Gathering Facts] ****
[WARNING]: Host '3.28.185.63' 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.
ok: [3.28.185.63]

TASK [install nginx and update cache] ****
changed: [3.28.185.63]

TASK [start nginx server] ****
changed: [3.28.185.63]

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

```

task4_nginx_browser_droplet



Task 5 – Single nginx target group & HTTPS prerequisites

task5_project_ansible_cfg_created

```

● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ touch ansible.cfg
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ls -la ansible.cfg
-rw-rw-rw- 1 codespace codespace 0 Jan 10 08:27 ansible.cfg
○ @23-22411-061-rgb →/workspaces/terraform_machine (main) $ 

```

task5_project_ansible_cfg

```

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

task5_main_tf_count_1

```

        }

    module "myapp-webserver" {
        source          = "./modules/webserver"
        env_prefix      = var.env_prefix
        instance_type   = var.instance_type
        availability_zone = var.availability_zone
        public_key      = var.public_key
        my_ip           = local.my_ip
        vpc_id          = aws_vpc.myapp_vpc.id
        subnet_id       = module.myapp-subnet.subnet.id

        # Loop count
        count           = 1
        # Use count.index to differentiate instances
        instance_suffix = count.index
    }
}

```

task5_terraform_apply_one_instance

```

@23-22411-061-rgb →/workspaces/terraform_machine (main) $ terraform apply -auto-approve
  "158.252.35.230",
  - "40.172.88.106",
  - "3.28.185.63",
]

module.myapp-webserver[2].aws_instance.myapp-server: Destroying... [id=i-07798e1b6872c05d3]
module.myapp-webserver[1].aws_instance.myapp-server: Destroying... [id=i-03994cf68cfc72658]
module.myapp-webserver[2].aws_instance.myapp-server: Still destroying... [id=i-07798e1b6872c05d3, 00m10s elapsed]
module.myapp-webserver[1].aws_instance.myapp-server: Still destroying... [id=i-03994cf68cfc72658, 00m10s elapsed]
module.myapp-webserver[1].aws_instance.myapp-server: Still destroying... [id=i-03994cf68cfc72658, 00m20s elapsed]
module.myapp-webserver[2].aws_instance.myapp-server: Still destroying... [id=i-07798e1b6872c05d3, 00m20s elapsed]
module.myapp-webserver[1].aws_instance.myapp-server: Still destroying... [id=i-03994cf68cfc72658, 00m30s elapsed]
module.myapp-webserver[2].aws_instance.myapp-server: Still destroying... [id=i-07798e1b6872c05d3, 00m30s elapsed]
module.myapp-webserver[2].aws_instance.myapp-server: Still destroying... [id=i-07798e1b6872c05d3, 00m40s elapsed]
module.myapp-webserver[1].aws_instance.myapp-server: Still destroying... [id=i-03994cf68cfc72658, 00m40s elapsed]
module.myapp-webserver[1].aws_instance.myapp-server: Destruction complete after 40s
module.myapp-webserver[1].aws_security_group.web_sg: Destroying... [id=sg-0b039adcf1f2b875b]
module.myapp-webserver[1].aws_key_pair.ssh-key: Destroying... [id=dev-serverkey-1]
module.myapp-webserver[1].aws_key_pair.ssh-key: Destruction complete after 0s
module.myapp-webserver[1].aws_security_group.web_sg: Destruction complete after 1s
module.myapp-webserver[2].aws_instance.myapp-server: Still destroying... [id=i-07798e1b6872c05d3, 00m50s elapsed]
module.myapp-webserver[2].aws_instance.myapp-server: Still destroying... [id=i-07798e1b6872c05d3, 01m00s elapsed]
module.myapp-webserver[2].aws_instance.myapp-server: Destruction complete after 1m1s
module.myapp-webserver[2].aws_key_pair.ssh-key: Destroying... [id=dev-serverkey-2]
module.myapp-webserver[2].aws_security_group.web_sg: Destroying... [id=sg-06a19682834e1624d]
module.myapp-webserver[2].aws_key_pair.ssh-key: Destruction complete after 0s
module.myapp-webserver[2].aws_security_group.web_sg: Destruction complete after 1s

Apply complete! Resources: 0 added, 0 changed, 6 destroyed.

Outputs:

webserver_public_ips = [
  "158.252.35.230",
]

```

task5_terraform_output_single_ip

```

  ]
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ terraform output
  webserver_public_ips = [
    "158.252.35.230",
  ]

```

task5_hosts_nginx_group

```
GNU nano 7.2                                     hosts *
```

```
[ec2]
40.172.88.106
158.252.35.230

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

[droplet]
3.28.185.63

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

[nginx]
158.252.35.230

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

task5_my_playbook_nginx_group

```
GNU nano 7.2                                     my-playbook.yaml *

---
- name: Configure nginx web server
  hosts: nginx
  become: true
  tasks:
    - name: install nginx and update cache
      yum:
        name: nginx
        state: present
        update_cache: yes

    - name: install openssl
      yum:
        name: openssl
        state: present

    - name: start nginx server
      service:
        name: nginx
        state: started
        enabled: true
```

task5_ansible_play_nginx_group

```

● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ansible-playbook -i hosts my-playbook.yaml
[WARNING]: Ansible is being run in a world writable directory (/workspaces/terraform_machine), ignoring it as an ansible.cfg source. For more information see https://docs.ansible.com/ansible-devel/reference_appendices/config.html#cfg-in-world-writable-dir

PLAY [Configure nginx web server] ****
TASK [Gathering Facts] ****
[WARNING]: Host '158.252.35.230' 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/2.28/reference_appendices/interpreter_discovery.html for more information.
ok: [158.252.35.230]

TASK [install nginx and update cache] ****
ok: [158.252.35.230]

TASK [install openssl] ****
ok: [158.252.35.230]

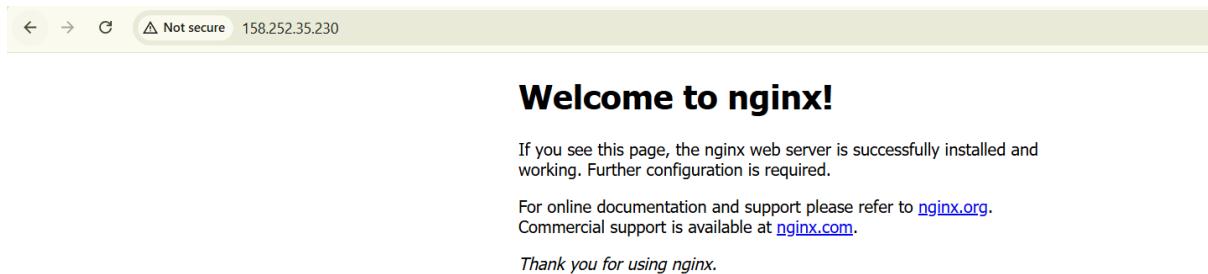
TASK [start nginx server] ****
changed: [158.252.35.230]

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

○ @23-22411-061-rgb →/workspaces/terraform_machine (main) $ █

```

task5_nginx_browser_single



Task 6 - Ansible-managed SSL certificates

task6_my_playbook_ssl_section

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
GNU nano 7.2                                         my-playbook.yaml *
```

```
---
- name: Configure nginx web server
  hosts: nginx
  become: true
  tasks:
    - name: install nginx and update cache
      yum:
        name: nginx
        state: present
        update_cache: yes

    - name: install openssl
      yum:
        name: openssl
        state: present

    - name: start nginx server
      service:
        name: nginx
        state: started
        enabled: true

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

task6_ansible_play_ssl

```
@23-22411-061-rgb → /workspaces/terraform_machine (main) $ ansible-playbook -i hosts my-playbook.yaml
TASK [install openssl] ****
ok: [158.252.35.230]

TASK [start nginx server] ****
ok: [158.252.35.230]

PLAY [Configure SSL certificates] ****
TASK [Gathering Facts] ****
ok: [158.252.35.230]

TASK [Create SSL private directory] ****
changed: [158.252.35.230]

TASK [Create SSL certs directory] ****
changed: [158.252.35.230]

TASK [Get IMDSv2 token] ****
ok: [158.252.35.230]

TASK [Get current public IP] ****
ok: [158.252.35.230]

TASK [Show current public IP] ****
ok: [158.252.35.230] => {
  "msg": "Public IP: 158.252.35.230"
}

TASK [Generate self-signed SSL certificate] ****
changed: [158.252.35.230]

PLAY RECAP ****
158.252.35.230 : ok=11  changed=3  unreachable=0  failed=0  skipped=0  rescued=0  ignored=0

@23-22411-061-rgb → /workspaces/terraform_machine (main) $
```

task6_ssl_cert_file

```
[ec2-user@ip-10-0-10-252 ~]$ sudo cat /etc/ssl/certs/selfsigned.crt
-----BEGIN CERTIFICATE-----
MIIDQTCCAimgAwIBAgIUGgxSgYo70sqY09I1dSQR879h6FowDQYJKoZIhvcNAQEL
BQAwGTEXMBUGA1UEAwOMTU4LjI1Mi4zNS4yMzAwHhcNMjYwMTEwMDg0NTMwWhcN
MjcwMTEwMDg0NTMwWjAZMRcwFQYDVQQDDA4xNTguMjUyLjM1LjIzMDCCASIwDQYJ
KoZIhvcNAQEQQADggEPADCCAQoCggEBALiIbeA6q/Vz6HvzBpSBnhXfxDMVmIKi
jCpN7JDw5594fUjX8WsLNyt3MuTgGlAeu+8RmX4B9Fe0tyX2K9ewD23Pnh6W5V7
kiuzBZSp6nUtTbGrsl0hdPa3e2VAEZoopXDQVym0VBpvC0SM0lnhCavzqnVjbJNr
3b9FN/2wfizxYYm0dqMYpt+pDwBHpeAbkOfMMljhqP4EHXl1+bePGEgwf/00/IV5
mo3g8q+A+apsYyXZ156br9gOF+GTx0b6erPtWPtHCJnUTP+NvndmUvYrHO4WE2Eh0
sFLe3Y6sPrcx+kK1GzvWqzw1b7Ga7Dm8YRYY6KG91oq0/QPqbAfNTsCAwEEAaOB
gDB+MB0GA1UdDgQWBBR9R2MfK8p5IYP4Do8pZRRWVM0ewDAPBgvNHRECDAGhwSe/CPmMAkGA1UdEwQCMAAw
CwYDVR0PBAQDAgwgMBMGA1UdJQQMMAoGCCsGAQUFBwMBMA0GCSqGSIb3DQEBCwUA
A4IBAQAF+snuRt6a0t0fr5sYXGdGFNy1IZbTC2E0rfHn8xi0m2vzGdenIrxaUFAX
TZamUwfmsPNWDB2ZHbkRTjpnFABPGoi7I0+ni38WU8a0ni1XBitIVXByEXjh1k
1h4PEufOJ14KINMqVz2ANaAker/5K6PYwu8NtpkeeCNNLywjN+ls8nk1JKQnyYX9
DJfUsftuVws+VQE7cPbI7VqluoVPJiFkt6Z9qJJFgyJR2ZGsq1/D1WaLgHFy8Elo
XrAVN85XEk6Iprk4HQ2Z1e0kaFq6VhgW6wh0tke6vXjQIP8JmqPrvll82yJ1CngL
wYog1+CtseCwaTLa79250kgDJja6
-----END CERTIFICATE-----
```

task6_ssl_key_file

```
[ec2-user@ip-10-0-10-252 ~]$ sudo cat /etc/ssl/certs/selfsigned.crt
-----BEGIN CERTIFICATE-----
MIIDQTCCAimgAwIBAgIUGgxSgYo70sqY09I1dSQR879h6FowDQYJKoZIhvcNAQEL
BQAwGTEXMBUGA1UEAwOMTU4LjI1Mi4zNS4yMzAwHhcNMjYwMTEwMDg0NTMwWhcN
MjcwMTEwMDg0NTMwWjAZMRcwFQYDVQQDDA4xNTguMjUyLjM1LjIzMDCCASIwDQYJ
KoZIhvcNAQEQQADggEPADCCAQoCggEBALiIbeA6q/Vz6HvzBpSBnhXfxDMVmIKi
jCpN7JDw5594fUjX8WsLNyt3MuTgGlAeu+8RmX4B9Fe0tyX2K9ewD23Pnh6W5V7
kiuzBZSp6nUtTbGrsl0hdPa3e2VAEZoopXDQVym0VBpvC0SM0lnhCavzqnVjbJNr
3b9FN/2wfizxYYm0dqMYpt+pDwBHpeAbkOfMMljhqP4EHXl1+bePGEgwf/00/IV5
mo3g8q+A+apsYyXZ156br9gOF+GTx0b6erPtWPtHCJnUTP+NvndmUvYrHO4WE2Eh0
sFLe3Y6sPrcx+kK1GzvWqzw1b7Ga7Dm8YRYY6KG91oq0/QPqbAfNTsCAwEEAaOB
gDB+MB0GA1UdDgQWBBR9R2MfK8p5IYP4Do8pZRRWVM0ewDAPBgvNHRECDAGhwSe/CPmMAkGA1UdEwQCMAAw
CwYDVR0PBAQDAgwgMBMGA1UdJQQMMAoGCCsGAQUFBwMBMA0GCSqGSIb3DQEBCwUA
A4IBAQAF+snuRt6a0t0fr5sYXGdGFNy1IZbTC2E0rfHn8xi0m2vzGdenIrxaUFAX
TZamUwfmsPNWDB2ZHbkRTjpnFABPGoi7I0+ni38WU8a0ni1XBitIVXByEXjh1k
1h4PEufOJ14KINMqVz2ANaAker/5K6PYwu8NtpkeeCNNLywjN+ls8nk1JKQnyYX9
DJfUsftuVws+VQE7cPbI7VqluoVPJiFkt6Z9qJJFgyJR2ZGsq1/D1WaLgHFy8Elo
XrAVN85XEk6Iprk4HQ2Z1e0kaFq6VhgW6wh0tke6vXjQIP8JmqPrvll82yJ1CngL
wYog1+CtseCwaTLa79250kgDJja6
-----END CERTIFICATE-----
```

Task 7 - PHP front-end deployment with templates

task7_files_templates_created

```
./aws/dist/prompt_toolkit-3.0.51.dist-info:  
INSTALLER METADATA RECORD WHEEL licenses top_level.txt  
  
../aws/dist/prompt_toolkit-3.0.51.dist-info/licenses:  
AUTHORS.rst LICENSE  
  
../aws/dist/setuptools:  
_vendor  
  
../aws/dist/setuptools/_vendor:  
jaraco  
  
../aws/dist/setuptools/_vendor/jaraco:  
text  
  
../aws/dist/setuptools/_vendor/jaraco/text:  
'Lorem ipsum.txt'  
  
../aws/dist/wheel-0.45.1.dist-info:  
INSTALLER LICENSE.txt METADATA RECORD REQUESTED WHEEL direct_url.json entry_points.txt  
  
../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  
@23-22411-061-rgb →/workspaces/terraform_machine (main) $ █
```

task7_index_php_content

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS vim

```

        border-radius: 5px;
    }
    .label {
        font-weight: bold;
        color: #ffd700;
    }
    .info a {
        color: white; /* same as other values */
        text-decoration: none; /* remove underline */
        font-weight: normal;
    }

    .info a:hover {
        text-decoration: underline; /* optional: underline on hover */
    }
</style>
</head>
<body>
<div class="container">
<h1>🔗 Nginx Front End Web Server </h1>

<div class="info"><span class="label">Hostname:</span> <?= htmlspecialchars($hostname) ?></div>
<div class="info"><span class="label">Instance ID:</span> <?= htmlspecialchars($instance_id) ?></div>
<div class="info"><span class="label">Private IP:</span> <?= htmlspecialchars($private_ip) ?></div>
<div class="info"><span class="label">Public IP:</span> <?= htmlspecialchars($public_ip) ?></div>
<div class="info"><span class="label">Public DNS:</span>
    <a href="https://<?= htmlspecialchars($public_dns) ?>" target="_blank">
        https://<?= htmlspecialchars($public_dns) ?></a>
</div>
<div class="info"><span class="label">Deployed:</span> <?= $deployed_date ?></div>
<div class="info"><span class="label">Status:</span>  Active and Running</div>
<div class="info"><span class="label">Managed By:</span> Terraform + Ansible</div>
</div>
</body>
</html>
```

task7_nginx_conf_template

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```

default_type application/octet-stream;

upstream backend_servers {
    server 158.252.94.241:80;
    server 158.252.94.242:80 backup;
}

server {
    listen 443 ssl;
    server_name {{ server_public_ip }};
    ssl_certificate /etc/ssl/certs/selfsigned.crt;
    ssl_certificate_key /etc/ssl/private/selfsigned.key;

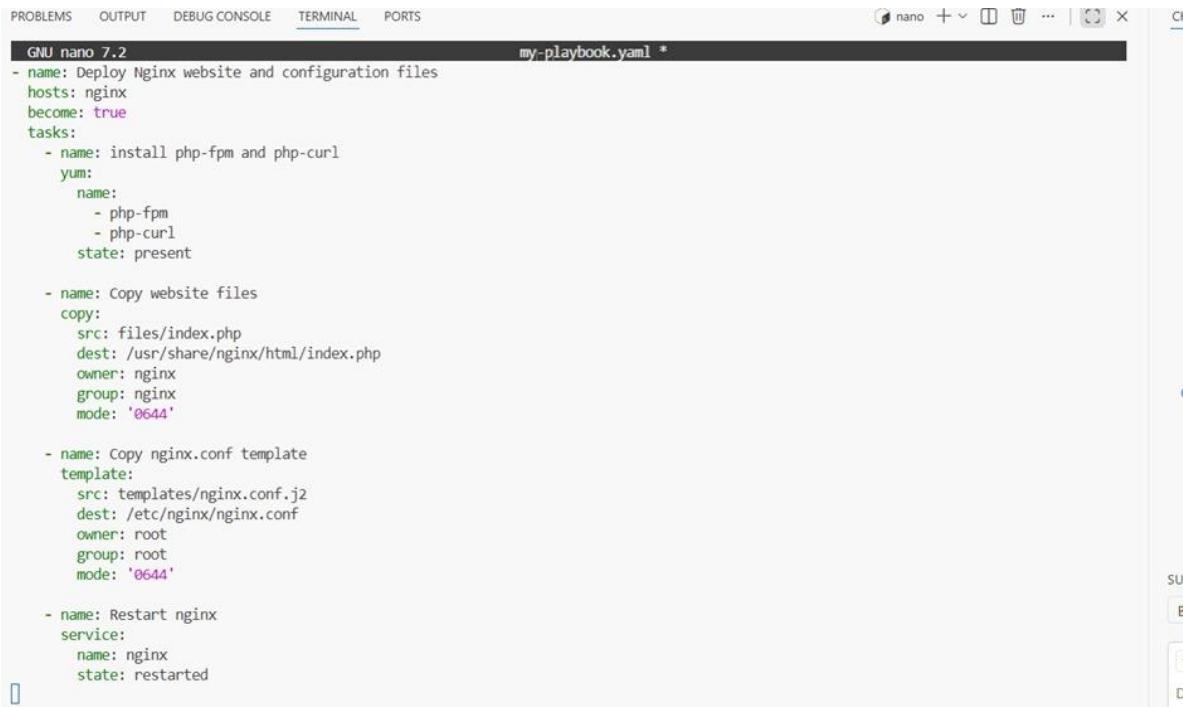
    location / {
        root /usr/share/nginx/html;
        index index.php index.html index.htm;
#       proxy_pass http://158.252.94.241:80;
#       proxy_pass http://backend_servers;

        # ● This block is necessary for Php Website
        location ~ \.php$ {
            include fastcgi_params;
            fastcgi_pass unix:/run/php-fpm/www.sock;
            fastcgi_index index.php;
            fastcgi_param SCRIPT_FILENAME $document_root$fastcgi_script_name;
        }
    }
}

server {
    listen 80;
    server_name _;
    return 301 https://$host$request_uri;
}
```

:wq!

task7_my_playbook_web_deploy



```
GNU nano 7.2                                         my-playbook.yaml *
```

```
- 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
      state: present

  - name: Copy website files
    copy:
      src: files/index.php
      dest: /usr/share/nginx/html/index.php
      owner: nginx
      group: nginx
      mode: '0644'

  - name: Copy nginx.conf template
    template:
      src: templates/nginx.conf.j2
      dest: /etc/nginx/nginx.conf
      owner: root
      group: root
      mode: '0644'

  - name: Restart nginx
    service:
      name: nginx
      state: restarted
```

task7_ansible_play_web_deploy

```
@23-22411-061-rgb →/workspaces/terraform_machine (main) $ ansible-playbook -i hosts my-playbook.yaml
TASK [Get current public IP] ****
ok: [158.252.35.230]

TASK [Show current public IP] ****
ok: [158.252.35.230] => {
    "msg": "Public IP: 158.252.35.230"
}

TASK [Generate self-signed SSL certificate] ****
ok: [158.252.35.230]

PLAY [Deploy Nginx website and configuration files] ****
TASK [Gathering Facts] ****
ok: [158.252.35.230]

TASK [install php-fpm and php-curl] ****
ok: [158.252.35.230]

TASK [Copy website files] ****
ok: [158.252.35.230]

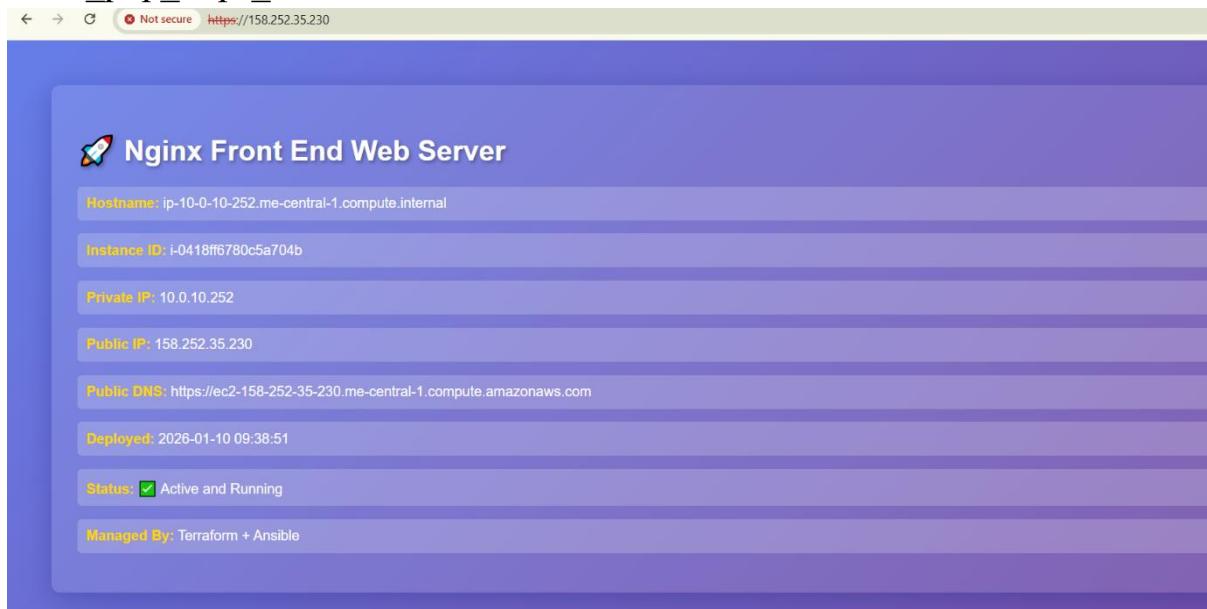
TASK [Copy nginx.conf template] ****
ok: [158.252.35.230]

TASK [Restart nginx] ****
changed: [158.252.35.230]

TASK [Start and enable php-fpm] ****
ok: [158.252.35.230]

PLAY RECAP ****
158.252.35.230 : ok=16    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

task7_php_https_browser



Task 8 – Docker & Docker Compose provisioning via Ansible

task8_terraform_destroy_old

```
@23-22411-061-rgb → /workspaces/terraform_machine (main) $ terraform destroy -auto-approve
} -> null
- vpc_id           = "vpc-0127d4f12387a0da5" -> null
# (1 unchanged attribute hidden)
}

Plan: 0 to add, 0 to change, 7 to destroy.

Changes to Outputs:
- webserver_public_ips = [
  - "158.252.35.230",
] -> null

module.myapp-subnet.aws_default_route_table.main_rt: Destroying... [id=rtb-017505bbfc1a015cd]
module.myapp-webserver[0].aws_instance.myapp-server: Destroying... [id=i-0418ff6780c5a704b]
module.myapp-subnet.aws_default_route_table.main_rt: Destruction complete after 0s
module.myapp-subnet.aws_internet_gateway.myapp_igw: Destroying... [id=igw-029f738241c010b94]
module.myapp-webserver[0].aws_instance.myapp-server: Still destroying... [id=i-0418ff6780c5a704b, 00m10s elapsed]
module.myapp-subnet.aws_internet_gateway.myapp_igw: Still destroying... [id=igw-029f738241c010b94, 00m10s elapsed]
module.myapp-webserver[0].aws_instance.myapp-server: Still destroying... [id=i-0418ff6780c5a704b, 00m20s elapsed]
module.myapp-subnet.aws_internet_gateway.myapp_igw: Still destroying... [id=igw-029f738241c010b94, 00m20s elapsed]
module.myapp-webserver[0].aws_instance.myapp-server: Still destroying... [id=i-0418ff6780c5a704b, 00m30s elapsed]
module.myapp-subnet.aws_internet_gateway.myapp_igw: Still destroying... [id=igw-029f738241c010b94, 00m30s elapsed]
module.myapp-subnet.aws_internet_gateway.myapp_igw: Destruction complete after 38s
module.myapp-webserver[0].aws_instance.myapp-server: Still destroying... [id=i-0418ff6780c5a704b, 00m40s elapsed]
module.myapp-webserver[0].aws_instance.myapp-server: Destruction complete after 41s
module.myapp-webserver[0].aws_key_pair.ssh-key: Destroying... [id=dev-serverkey-0]
module.myapp-subnet.0.aws_subnet.myapp_subnet_1: Destroying... [id=subnet-050e94d5cab067ea9]
module.myapp-webserver[0].aws_security_group.web_sg: Destroying... [id=sg-0a77747f92f8da53c]
module.myapp-webserver[0].aws_key_pair.ssh-key: Destruction complete after 0s
module.myapp-subnet.0.aws_subnet.myapp_subnet_1: Destruction complete after 1s
module.myapp-webserver[0].aws_security_group.web_sg: Destruction complete after 1s
aws_vpc.myapp_vpc: Destroying... [id=vpc-0127d4f12387a0da5]
aws_vpc.myapp_vpc: Destruction complete after 1s

Destroy complete! Resources: 7 destroyed.
@23-22411-061-rgb → /workspaces/terraform_machine (main) $
```

task8_terraform_apply_docker_instance

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
GNU nano 7.2 main.tf
tags = {
    Name = "${var.env_prefix}-vpc"
}

module "myapp-subnet" {
    source = "./modules/subnet"
    vpc_id = aws_vpc.myapp_vpc.id
    subnet_cidr_block = var.subnet_cidr_block
    availability_zone = var.availability_zone
    env_prefix = var.env_prefix
    default_route_table_id = aws_vpc.myapp_vpc.default_route_table_id
}

module "myapp-webserver" {
    source          = "./modules/webserver"
    env_prefix      = var.env_prefix
    instance_type   = var.instance_type
    availability_zone = var.availability_zone
    public_key      = var.public_key
    my_ip           = local.my_ip
    vpc_id          = aws_vpc.myapp_vpc.id
    subnet_id       = module.myapp-subnet.subnet.id

    # Loop count
    count = 1

    # Use count.index to differentiate instances
    instance_suffix = count.index
}

```

task8_terraform_output_new_ip

```
]
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ terraform output
webserver_public_ips = [
    "3.28.44.66",
]
○ @23-22411-061-rgb →/workspaces/terraform_machine (main) $ █
↳ 0 ↳ 0
```

task8_hosts_docker_servers

```
[ec2]
40.172.88.106
158.252.35.230

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

[droplet]
3.28.185.63

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

[nginx]
158.252.35.230

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

[docker_servers]
3.28.44.66

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

task8_my_playbook_docker

```

- name: install docker and update cache
  yum:
    name: docker
    state: present
    update_cache: yes

- name: Install Docker Compose
  hosts: all
  become: true
  gather_facts: true
  tasks:
    - name: create docker cli-plugins directory
      file:
        path: /usr/local/lib/docker/cli-plugins
        state: directory
        mode: '0755'

    - name: install docker-compose
      get_url:
        url: https://github.com/docker/compose/releases/latest/download/docker-compose-linux-{{ lookup('pipe', 'uname -m') }}
        dest: /usr/local/lib/docker/cli-plugins/docker-compose
        mode: '+x'

    - name: View architecture of the system
      debug:
        msg: "System architecture of {{ inventory_hostname }} is {{ ansible_facts['architecture'] }}"

    - name: Alternate method to view architecture of the system
      debug:
        msg: "System architecture of {{inventory_hostname}} is {{ lookup('pipe', 'uname -m') }}"

    - name: restart docker service
      service:
        name: docker
        state: restarted

```

task8_ansible_play_docker

The screenshot shows a terminal window with the following output:

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
@23-22411-057-sudo →/workspaces/terraform_machine (main) $ ansible-playbook -i hosts my-playbook.yaml

TASK [Gathering Facts] *****
ok: [158.252.83.114]

TASK [install docker and update cache] *****
changed: [158.252.83.114]

PLAY [Install Docker Compose] *****
TASK [Gathering Facts] *****
ok: [158.252.83.114]

TASK [create docker cli-plugins directory] *****
changed: [158.252.83.114]

TASK [install docker-compose] *****
changed: [158.252.83.114]

TASK [View architecture of the system] *****
ok: [158.252.83.114] => {
    "msg": "System architecture of 158.252.83.114 is x86_64"
}

TASK [Alternate method to view architecture of the system] *****
ok: [158.252.83.114] => {
    "msg": "System architecture of 158.252.83.114 is x86_64"
}

TASK [restart docker service] *****
changed: [158.252.83.114]

PLAY RECAP *****
158.252.83.114 : ok=25   changed=7    unreachable=0   failed=0    skipped=0   rescued=0    ignored=0

@23-22411-057-sudo →/workspaces/terraform_machine (main) $

```

task8_docker_ps_remote

```
@23-22411-061-rgb →/workspaces/terraform_machine (main) $ ssh -i ~/.ssh/id_ed25519 ec2-user@3.28.44.66
,      #
~\_ #####      Amazon Linux 2023
~~ \#####\
~~  \###|
~~   \#/  ___  https://aws.amazon.com/linux/amazon-linux-2023
~~    \~' '-'>
~~     /
~~.._./
~~  /_/
~~  /m'

Last login: Sat Jan 10 10:28:30 2026 from 4.240.18.225
[ec2-user@ip-10-0-10-199 ~]$ sudo docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED            STATUS              PORTS          NAMES
[ec2-user@ip-10-0-10-199 ~]$ exit
```

Task 9 – Gitea Docker stack via Ansible + Terraform security group update

task9 my playbook add user to docker

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

user:
  name: "{{ normal_user }}"
  groups: docker
  append: yes

- name: reconnect to apply group changes
  meta: reset_connection

- name: verify docker access
  command: docker ps
  register: docker_ps
  changed_when: false

- name: display docker ps output
  debug:
    var: docker_ps.stdout

- name: fail if docker is not accessible
  fail:
    msg: "Docker is not accessible on this host"
    when: docker_ps.rc != 0
```

task9 project vars

```
normal_user: ec2-user
docker_compose_file_location: /workspaces/terraform_machine
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
```

task9_my_playbook_deploy_containers

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

fail:
  msg: "Docker is not accessible on this host"
when: docker_ps.rc != 0

- name: Deploy Docker Containers
hosts: all
become: true
user: "{{ normal_user }}"
vars_files:
  - project-vars.yaml
tasks:
  - name: check if docker-compose file exists
    stat:
      path: /home/{{ normal_user }}/compose.yaml
    register: compose_file

  - name: copy docker-compose file
    copy:
      src: "{{ docker_compose_file_location }}/compose.yaml"
      dest: /home/{{ normal_user }}/compose.yaml
      mode: '0644'
    when: not compose_file.stat.exists

  - name: deploy containers using docker-compose
    command: docker compose up -d
    register: compose_result
    changed_when: "'Creating' in compose_result.stdout or 'Recreating' in compose_result.stdout"
```

task9_compose_yaml

```

extra_hosts:
  - "www.jenkins.com:host-gateway"
networks:
  - webnet
db:
  image: postgres:alpine
  container_name: gitea_db
  environment:
    - POSTGRES_USER=gitea
    - POSTGRES_PASSWORD=gitea
    - POSTGRES_DB=gitea
  restart: always
  volumes:
    - gitea_postgres:/var/lib/postgresql/data
  expose:
    - 5432
networks:
  - webnet

volumes:
  gitea_postgres:
    name: gitea_postgres
  gitea:
    name: gitea

networks:
  webnet:
    name: webnet

```

task9_ansible_play_gitea

```

@23-22411-061-rgb → /workspaces/terraform_machine (main) $ ansible-playbook -i hosts my-playbook.yaml
  "msg": "System architecture of 3.28.44.66 is x86_64"
}

TASK [Add user to docker group] ****
ok: [3.28.44.66]

TASK [Reconnect to apply group changes] ****
ok: [3.28.44.66]

TASK [Verify docker access] ****
ok: [3.28.44.66]

TASK [Display docker ps output] ****
ok: [3.28.44.66] => {
    "docker_ps_stdout": "CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS
      NAMES\nhb2dec37b6a5 postgres:alpine \\"docker-entrypoint.s...\\\" 38 minutes ago Up 38 minutes 5432/tcp
      gitea_db\n89a32eb25e17 gitea/gitea:latest \\"/usr/bin/entrypoint...\\\" 38 minutes ago Up 38 minutes 22/tcp, 0.0.0.0:3000->3000/tcp, :::3000->3000/tcp
      gitea"
}

TASK [Fail if docker is not accessible] ****
skipping: [3.28.44.66]

TASK [Check if docker-compose file exists] ****
ok: [3.28.44.66]

TASK [Copy docker-compose file] ****
skipping: [3.28.44.66]

TASK [Deploy containers using docker-compose] ****
ok: [3.28.44.66]

PLAY RECAP ****
3.28.44.66 : ok=11  changed=1    unreachable=0   failed=0   skipped=2   rescued=0   ignored=0

```

task9_sg_ingress_3000

```

        protocol    = "tcp"
        cidr_blocks = ["0.0.0.0/0"]
    }
    ingress {
        from_port    = 80
        to_port      = 80
        protocol    = "tcp"
        cidr_blocks = ["0.0.0.0/0"]
    }
    ingress {
        from_port    = 3000
        to_port      = 3000
        protocol    = "tcp"
        cidr_blocks = ["0.0.0.0/0"]
    }
}

egress {
    from_port    = 0
    to_port      = 0
    protocol    = "-1"
    cidr_blocks = ["0.0.0.0/0"]
    prefix_list_ids = []
}
tags = {
    Name = "${var.env_prefix}-default-sg"
}

```

task9_terraform_apply_sg_3000

```

@23-22411-061-rgb → /workspaces/terraform_machine (main) $ terraform apply -auto-approve
+ self          = false
+ to_port       = 80
},
+
+ {
+   cidr_blocks   = [
+     "4.240.18.225/32",
+   ]
+   from_port     = 22
+   ipv6_cidr_blocks = []
+   prefix_list_ids = []
+   protocol      = "tcp"
+   security_groups = []
+   self          = false
+   to_port       = 22
},
]
name          = "dev-web-sg-0"
tags          = {
  "Name" = "dev-default-sg"
}
# (9 unchanged attributes hidden)
}

Plan: 0 to add, 1 to change, 0 to destroy.
module.myapp-webserver[0].aws_security_group.web_sg: Modifying... [id=sg-0089c76e336221e4c]
module.myapp-webserver[0].aws_security_group.web_sg: Modifications complete after 1s [id=sg-0089c76e336221e4c]

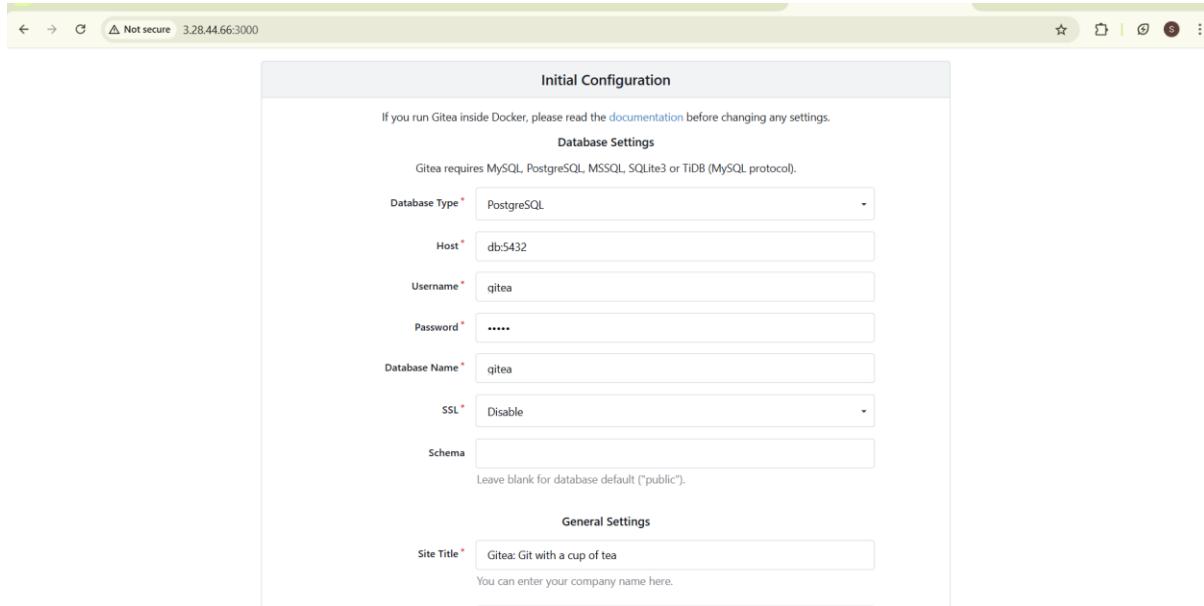
Apply complete! Resources: 0 added, 1 changed, 0 destroyed.

Outputs:

webserver_public_ips = [
  "3.28.44.66",
]

```

task9_gitea_browser



Task 10 – Automating Ansible with Terraform (null_resource)

task10_null_resource_main_tf

```
GNU nano 7.2                                     modules/webserver/main.tf *
```

```
resource "aws_instance" "myapp-server" {
  ami           = "ami-05524d6658fcf35b6" # Amazon Linux 2023 Kernel 6.1 AMI
  instance_type = var.instance_type
  subnet_id     = var.subnet_id
  vpc_security_group_ids = [aws_security_group.web_sg.id]
  availability_zone = var.availability_zone
  associate_public_ip_address = true
  key_name = aws_key_pair.ssh-key.key_name

  #user_data = file(var.script_path)

  tags = {
    Name = "${var.env_prefix}-ec2-instance-${var.instance_suffix}"
  }
}

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

  depends_on = [module.myapp-webserver]

  provisioner "local-exec" {
    command = <<-EOT
      ansible-playbook -i ${self.triggers.webserver_public_ips_for_ansible}, \
        --private-key "${var.private_key}" --user ec2-user \
        my-playbook.yaml
    EOT
  }
}
```

task10_terraform_destroy_before_null

```
@23-22411-061-rgb →/workspaces/terraform_machine (main) $ terraform destroy -auto-approve
] → null
module.myapp-subnet.aws_default_route_table.main_rt: Destroying... [id=tb-0ded208df7ed654d4]
module.myapp-subnet.aws_default_route_table.main_rt: Destruction complete after 0s
module.myapp-webserver[0].aws_instance.myapp-server: Destroying... [id=i-008dd95e4ceb8393f]
module.myapp-subnet.aws_internet_gateway.myapp_igw: Destroying... [id=igw-03f1548db5c81a3d1]
module.myapp-webserver[0].aws_instance.myapp-server: Still destroying... [id=i-008dd95e4ceb8393f, 00m10s elapsed]
module.myapp-subnet.aws_internet_gateway.myapp_igw: Still destroying... [id=igw-03f1548db5c81a3d1, 00m10s elapsed]
module.myapp-webserver[0].aws_instance.myapp-server: Still destroying... [id=i-008dd95e4ceb8393f, 00m20s elapsed]
module.myapp-subnet.aws_internet_gateway.myapp_igw: Still destroying... [id=igw-03f1548db5c81a3d1, 00m20s elapsed]
module.myapp-subnet.aws_internet_gateway.myapp_igw: Destruction complete after 28s
module.myapp-webserver[0].aws_instance.myapp-server: Still destroying... [id=i-008dd95e4ceb8393f, 00m30s elapsed]
module.myapp-webserver[0].aws_instance.myapp-server: Destruction complete after 30s
module.myapp-webserver[0].aws_security_group.web_sg: Destroying... [id=sg-0089c76e336221e4c]
module.myapp-subnet.aws_subnet.myapp_subnet_1: Destroying... [id=subnet-019bcd8cad4725a50]
module.myapp-webserver[0].aws_key_pair.ssh-key: Destroying... [id=dev-serverkey-0]
module.myapp-webserver[0].aws_key_pair.ssh-key: Destruction complete after 1s
module.myapp-subnet.aws_subnet.myapp_subnet_1: Destruction complete after 1s
module.myapp-webserver[0].aws_security_group.web_sg: Destruction complete after 1s
aws_vpc.myapp_vpc: Destroying... [id=vpc-037863ef2856f7a45]
aws_vpc.myapp_vpc: Destruction complete after 1s
```

Destroy complete! Resources: 7 destroyed.

task10_terraform_apply_with_local_exec

```
@23-22411-061-rgb →/workspaces/terraform_machine (main) $ terraform apply -auto-approve
null_resource.configure_server (local-exec): [ERROR]: the playbook:
null_resource.configure_server (local-exec): could not be found
null_resource.configure_server (local-exec): /bin/sh: 2: --private-key: not found
null_resource.configure_server (local-exec): /bin/sh: 3: my-playbook.yaml
null_resource.configure_server (local-exec): : not found

Error: local-exec provisioner error

with null_resource.configure_server,
on main.tf line 45, in resource "null_resource" "configure_server":
45:   provisioner "local-exec" {  

  Error running command 'ansible-playbook -i 51.112.53.48, \
--private-key "./.ssh/id_ed25519" --user ec2-user \
my-playbook.yaml
': exit status 127, output: [WARNING]: Ansible is being run in a world writable directory (/workspaces/terraform_machine), ignoring it as an ansible.cfg source. For more information see https://docs.ansible.com/ansible-devel/reference_appendices/config.html#cfg-in-world-writable-dir
could not be foundbook:
/bin/sh: 2: --private-key: not found
: not found3: my-playbook.yaml
```

task10_my_playbook_wait_for_ssh

```

GNU nano 7.2                                         my-playbook.yaml

- name: Wait for SSH to be available
  hosts: all
  gather_facts: no
  tasks:
    - name: Wait for port 22 to be ready
      wait_for:
        host: "{{ inventory_hostname }}"
        port: 22
        timeout: 300
        state: started

- name: Configure EC2 with Nginx and Gitea
  hosts: all
  become: true

  tasks:
    - name: Update packages
      yum:
        name: "*"
        state: latest

    - name: Install required packages
      yum:
        name:
          - nginx
          - git
        state: present

    - name: Enable and start Nginx
      service:
        name: nginx

```

task10_terraform_apply_after_wait

```

@23-22411-061-rgb ~ /workspaces/terraform_machine (main) $ terraform apply -auto-approve
module.myapp-subnet.aws_subnet.myapp_subnet_1: Still creating... [00m10s elapsed]
module.myapp-subnet.aws_subnet.myapp_subnet_1: Creation complete after 11s [id=subnet-0813aebf3e598c571]
module.myapp-webserver[0].aws_instance.myapp-server: Creating...
module.myapp-webserver[0].aws_instance.myapp-server: Still creating... [00m10s elapsed]
module.myapp-webserver[0].aws_instance.myapp-server: Creation complete after 12s [id=i-027b2d26789a85026]
null_resource.configure_server: Creating...
null_resource.configure_server: Provisioning with 'local-exec'...
null_resource.configure_server (local-exec): Executing: ["./bin/sh" "-c" "ansible-playbook -i 51.112.187.163, --private-key ~/.ssh/id_ed25519 --user root -e -vvv ./playbook.yaml"]
null_resource.configure_server (local-exec): [WARNING]: Ansible is being run in a world writable directory (/workspaces/terraform_machine), ignoring ansible.cfg source. For more information see https://docs.ansible.com/ansible-devel/reference_appendices/config.html#cfg-in-world-writable-dir
null_resource.configure_server (local-exec): PLAY [Wait for some time to ensure system readiness] ****
null_resource.configure_server (local-exec): TASK [Wait 300 seconds for port 22 to become open and contain "OpenSSH"] ****
null_resource.configure_server: Still creating... [00m10s elapsed]
null_resource.configure_server (local-exec): [WARNING]: Could not match supplied host pattern, ignoring: docker_servers
null_resource.configure_server (local-exec): ok: [51.112.187.163 -> localhost]

null_resource.configure_server (local-exec): PLAY [Configure Docker & Deploy Containers] ****
null_resource.configure_server (local-exec): skipping: no hosts matched

null_resource.configure_server (local-exec): PLAY RECAP ****
null_resource.configure_server (local-exec): 51.112.187.163 : ok=1    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

null_resource.configure_server: Creation complete after 12s [id=1690333078838817863]

Apply complete! Resources: 8 added, 0 changed, 0 destroyed.

Outputs:

webserver_public_ips = [
  "51.112.187.163",
]

```

task10_app_browser_post_null_resource

If you run Gitea inside Docker, please read the [documentation](#) before changing any settings.

Database Settings

Gitea requires MySQL, PostgreSQL, MSSQL, SQLite3 or TiDB (MySQL protocol).

Database Type *	PostgreSQL
Host *	db:5432
Username *	gitea
Password *	*****
Database Name *	qitea
SSL *	Disable
Schema	Leave blank for database default ("public").

General Settings

Site Title *	Gitea: Git with a cup of tea
You can enter your company name here.	
Repository Root Path *	/data/git/repositories

Task 11 – Dynamic inventory with aws_ec2 plugin

task11_ansible_cfg_aws_ec2

```
[defaults]
host_key_checking=False
interpreter_python = /usr/bin/python3
deprecation_warnings=False
enable_plugins=aws_ec2
private_key_file=~/ssh/id_ed25519
~
```

task11_inventory_aws_ec2_created

```
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ls -la inventory_aws_ec2.yaml
-rw-rw-rw- 1 codespace codespace 0 Jan 10 16:34 inventory_aws_ec2.yaml
○ @23-22411-061-rgb →/workspaces/terraform_machine (main) $
```

task11_inventory_aws_ec2_initial

```
---  
plugin: aws_ec2  
regions:  
  - me-central-1  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~
```

task11_main_tf_dev_prod_modules

```
MODULES OUTPUT TERMINAL FONTS  
  
public_key = var.public_key  
my_ip = local.my_ip  
vpc_id = aws_vpc.myapp_vpc.id  
subnet_id = module.myapp-subnet.subnet.id  
  
# Loop count  
count      = 1  
# Use count.index to differentiate instances  
instance_suffix  = count.index  
}  
  
module "myapp-webserver-prod" {  
  source = "./modules/webserver"  
  env_prefix = "prod"  
  instance_type = "t3.nano"  
  availability_zone = var.availability_zone  
  public_key = var.public_key  
  my_ip = local.my_ip  
  vpc_id = aws_vpc.myapp_vpc.id  
  subnet_id = module.myapp-subnet.subnet.id  
  
  # Loop count  
  count      = 1  
  # Use count.index to differentiate instances  
  instance_suffix  = count.index
```

task11_outputs_tf_dev_prod_ips

```
output "webserver_public_ips" {
    value = [for i in module.myapp-webserver : i.aws_instance.public_ip]
}

output "prod-webserver_public_ips" {
    value = [for i in module.myapp-webserver-prod : i.aws_instance.public_ip]
}
~
```

task11 terraform apply dynamic setup

```
@23-22411-061-rgb → /workspaces/terraform_machine (main) $ terraform apply -auto-approve
}

Plan: 3 to add, 1 to change, 1 to destroy.

Changes to Outputs:
+ prod-webserver_public_ips = [
    + (known after apply),
]

null_resource.configure_server: Destroying... [id=1690333078838817863]
null_resource.configure_server: Destruction complete after 0s
module.myapp-webserver-prod[0].aws_key_pair.ssh-key: Creating...
module.myapp-webserver-prod[0].aws_security_group.web_sg: Creating...
module.myapp-webserver[0].aws_security_group.web_sg: Modifying... [id=sg-0863b9335d553f9c5]
module.myapp-webserver-prod[0].aws_key_pair.ssh-key: Creation complete after 1s [id=prod-serverkey-0]
module.myapp-webserver[0].aws_security_group.web_sg: Modifications complete after 2s [id=sg-0863b9335d553f9c5]
module.myapp-webserver-prod[0].aws_security_group.web_sg: Creation complete after 3s [id=sg-0c546cd1ddd0cb2b9]
module.myapp-webserver-prod[0].aws_instance.myapp-server: Creating...
module.myapp-webserver-prod[0].aws_instance.myapp-server: Still creating... [00m10s elapsed]
module.myapp-webserver-prod[0].aws_instance.myapp-server: Creation complete after 13s [id=i-02dd29264b6acb6aa]

Apply complete! Resources: 3 added, 1 changed, 1 destroyed.

Outputs:

prod-webserver_public_ips = [
    "3.29.15.146",
]
webserver_public_ips = [
    "51.112.187.163",
]
@23-22411-061-rgb → /workspaces/terraform_machine (main) $
```

task11 terraform output dynamic ips

```
| @23-22411-061-rgb → /workspaces/terraform_machine (main) $ terraform output
prod-webserver_public_ips = [
    "3.29.15.146",
]
webserver_public_ips = [
    "51.112.187.163",
]
```

task11 boto install

```

@23-22411-061-rgb → /workspaces/terraform_machine (main) $ $(which python) -m pip install boto3 botocore
Collecting boto3
  Downloading boto3-1.42.25-py3-none-any.whl.metadata (6.8 kB)
Collecting botocore
  Downloading botocore-1.42.25-py3-none-any.whl.metadata (5.9 kB)
Collecting jmespath<2.0.0,>=0.7.1 (from boto3)
  Downloading jmespath-1.0.1-py3-none-any.whl.metadata (7.6 kB)
Collecting s3transfer<0.17.0,>=0.16.0 (from boto3)
  Downloading s3transfer-0.16.0-py3-none-any.whl.metadata (1.7 kB)
Requirement already satisfied: python-dateutil<3.0.0,>=2.1 in /home/codespace/.local/lib/python3.12/site-packages (from botocore) (2.9.0.post0)
Requirement already satisfied: urllib3!=2.2.0,<3,>=1.25.4 in /home/codespace/.local/lib/python3.12/site-packages (from botocore) (2.5.0)
Requirement already satisfied: six>=1.5 in /home/codespace/.local/lib/python3.12/site-packages (from python-dateutil<3.0.0,>=2.1->botocore) (1.17.0)
Downloaded boto3-1.42.25-py3-none-any.whl (140 kB)
Downloaded botocore-1.42.25-py3-none-any.whl (14.6 MB) 14.6/14.6 MB 28.3 MB/s 0:00:00
Downloaded jmespath-1.0.1-py3-none-any.whl (20 kB)
Downloaded s3transfer-0.16.0-py3-none-any.whl (86 kB)
Installing collected packages: jmespath, botocore, s3transfer, boto3
Successfully installed boto3-1.42.25 botocore-1.42.25 jmespath-1.0.1 s3transfer-0.16.0
@23-22411-061-rgb → /workspaces/terraform_machine (main) $ 

```

task11_boto_version

```

Successfully installed boto3-1.42.25 botocore-1.42.25 jmespath-1.0.1 s3transfer-0.16.0
● @23-22411-061-rgb → /workspaces/terraform_machine (main) $ $(which python) -c "import boto3, botocore; print(boto3.__version__)"
1.42.25
○ @23-22411-061-rgb → /workspaces/terraform_machine (main) $ 

```

task11_ansible_inventory_graph_initial

```

@23-22411-061-rgb → /workspaces/terraform_machine (main) $ ansible-inventory -i inventory_aws_ec2.yaml --graph
Failed to parse inventory with 'auto' plugin.

<<< caused by >>>

inventory config '/workspaces/terraform_machine/inventory_aws_ec2.yaml' specifies unknown plugin 'aws_ec2'
Origin: <inventory plugin 'auto' with source '/workspaces/terraform_machine/inventory_aws_ec2.yaml'>

[WARNING]: Failed to parse inventory with 'yaml' plugin: Plugin configuration YAML file, not YAML inventory

Failed to parse inventory with 'yaml' plugin.

<<< caused by >>>

Plugin configuration YAML file, not YAML inventory
Origin: <inventory plugin 'yaml' with source '/workspaces/terraform_machine/inventory_aws_ec2.yaml'>

[WARNING]: Failed to parse inventory with 'ini' plugin: Failed to parse inventory: Invalid host pattern '---' supplied, '---' is normally a sign this is a YAML file.

Failed to parse inventory with 'ini' plugin.

<<< caused by >>>

Failed to parse inventory: Invalid host pattern '---' supplied, '---' is normally a sign this is a YAML file.
Origin: /workspaces/terraform_machine/inventory_aws_ec2.yaml

[WARNING]: Unable to parse /workspaces/terraform_machine/inventory_aws_ec2.yaml as an inventory source
[WARNING]: No inventory was parsed, only implicit localhost is available
@all:
 |-@ungrouped:
@23-22411-061-rgb → /workspaces/terraform_machine (main) $ 

```

Task 12 – Filtering EC2 instances by tags & instance type

task12_inventory_aws_ec2_tag_groups

```
.w4:  
plugin: aws_ec2  
regions:  
  - me-central-1  
  
keyed_groups:  
  - key: tags  
    prefix: tag  
    separator: "_"  
  
~  
~  
~  
~  
~
```

task12_inventory_graph_tag_groups

```
@23-22411-061-rgb → /workspaces/terraform_machine (main) $ ansible-inventory -i inventory_aws_ec2.yaml --graph  
[WARNING]: Failed to parse inventory with 'yaml' plugin: Plugin configuration YAML file, not YAML inventory  
  
Failed to parse inventory with 'yaml' plugin.  
  
<<< caused by >>>  
  
Plugin configuration YAML file, not YAML inventory  
Origin: <inventory plugin 'yaml' with source '/workspaces/terraform_machine/inventory_aws_ec2.yaml'>  
  
[WARNING]: Failed to parse inventory with 'ini' plugin: Failed to parse inventory: Invalid host pattern '---' supplied  
, '---' is normally a sign this is a YAML file.  
  
Failed to parse inventory with 'ini' plugin.  
  
<<< caused by >>>  
  
Failed to parse inventory: Invalid host pattern '---' supplied, '---' is normally a sign this is a YAML file.  
Origin: /workspaces/terraform_machine/inventory_aws_ec2.yaml  
  
[WARNING]: Unable to parse /workspaces/terraform_machine/inventory_aws_ec2.yaml as an inventory source  
[WARNING]: No inventory was parsed, only implicit localhost is available  
@all:  
  |--@ungrouped:  
  @23-22411-061-rgb → /workspaces/terraform_machine (main) $
```

task12_inventory_aws_ec2_instance_type_groups

```
---  
plugin: aws_ec2  
regions:  
  - me-central-1  
keyed_groups:  
  - key: tags  
    prefix: tag  
    separator: "_"  
  
  - key: instance_type  
    prefix: instance_type  
    separator: "_"
```

task12_inventory_graph_full

```
@23-22411-061-rgb →/workspaces/terraform_machine (main) $ ansible-inventory -i inventory_aws_ec2.yaml --graph  
  
inventory config '/workspaces/terraform_machine/inventory_aws_ec2.yaml' specifies unknown plugin 'aws_ec2'  
Origin: <inventory plugin 'auto' with source '/workspaces/terraform_machine/inventory_aws_ec2.yaml'>  
  
[WARNING]: Failed to parse inventory with 'yaml' plugin: Plugin configuration YAML file, not YAML inventory  
  
Failed to parse inventory with 'yaml' plugin.  
  
<<< caused by >>>  
  
Plugin configuration YAML file, not YAML inventory  
Origin: <inventory plugin 'yaml' with source '/workspaces/terraform_machine/inventory_aws_ec2.yaml'>  
  
[WARNING]: Failed to parse inventory with 'ini' plugin: Failed to parse inventory: Invalid host pattern '---' supplied  
, '---' is normally a sign this is a YAML file.  
  
Failed to parse inventory with 'ini' plugin.  
  
<<< caused by >>>  
  
Failed to parse inventory: Invalid host pattern '---' supplied, '---' is normally a sign this is a YAML file.  
Origin: /workspaces/terraform_machine/inventory_aws_ec2.yaml  
  
[WARNING]: Unable to parse /workspaces/terraform_machine/inventory_aws_ec2.yaml as an inventory source  
[WARNING]: No inventory was parsed, only implicit localhost is available  
@all:  
| --@ungrouped:
```

task12_my_playbook_all_hosts

```
-- INSERT --
```

```
- name: Copy website files
  copy:
    src: files/index.php
    dest: /usr/share/nginx/html/index.php
    owner: nginx
    group: nginx
    mode: '0644'

- name: Copy nginx.conf template
  template:
    src: templates/nginx.conf.j2
    dest: /etc/nginx/nginx.conf
    owner: root
    group: root
    mode: '0644'

- name: Restart nginx
  service:
    name: nginx
    state: restarted

- name: Start and enable php-fpm
  service:
    name: php-fpm
    state: started
    enabled: true
```

task12_ansible_play_all

```
@23-22411-061-rgb → /workspaces/terraform_machine (main) $ ansible-playbook -i inventory_aws_ec2.yaml my-playbook.yaml
```

```
[WARNING]: Failed to parse inventory with 'ini' plugin: Failed to parse inventory: Invalid host pattern '---' supplied
, '---' is normally a sign this is a YAML file.
```

```
Failed to parse inventory with 'ini' plugin.
```

```
<<< caused by >>>
```

```
Failed to parse inventory: Invalid host pattern '---' supplied, '---' is normally a sign this is a YAML file.
Origin: /workspaces/terraform_machine/inventory_aws_ec2.yaml
```

```
[WARNING]: Unable to parse /workspaces/terraform_machine/inventory_aws_ec2.yaml as an inventory source
[WARNING]: No inventory was parsed, only implicit localhost is available
[WARNING]: provided hosts list is empty, only localhost is available. Note that the implicit localhost does not match 'all'
```

```
PLAY [Configure nginx web server] ****
skipping: no hosts matched
```

```
PLAY [Configure SSL certificates] ****
skipping: no hosts matched
```

```
PLAY [Deploy Nginx website and configuration files] ****
skipping: no hosts matched
```

```
PLAY RECAP ****
```

task12_ansible_play_dev_only

```
@23-22411-061-rgb →/workspaces/terraform_machine (main) $ ansible-playbook -i inventory_aws_ec2.yaml -l tag_Name_dev_*
* my-playbook.yaml
, '---' is normally a sign this is a YAML file.

Failed to parse inventory with 'ini' plugin.

<<< caused by >>>

Failed to parse inventory: Invalid host pattern '---' supplied, '---' is normally a sign this is a YAML file.
Origin: /workspaces/terraform_machine/inventory_aws_ec2.yaml

[WARNING]: Unable to parse /workspaces/terraform_machine/inventory_aws_ec2.yaml as an inventory source
[WARNING]: No inventory was parsed, only implicit localhost is available
[WARNING]: provided hosts list is empty, only localhost is available. Note that the implicit localhost does not match
'all'
[WARNING]: Could not match supplied host pattern, ignoring: tag_Name_dev_*

PLAY [Configure nginx web server] ****
skipping: no hosts matched

PLAY [Configure SSL certificates] ****
skipping: no hosts matched

PLAY [Deploy Nginx website and configuration files] ****
skipping: no hosts matched

PLAY RECAP ****
```

task12_ansible_play_prod_only

```
@23-22411-061-rgb →/workspaces/terraform_machine (main) $ ansible-playbook -i inventory_aws_ec2.yaml -l tag_Name_prod_*
* my-playbook.yaml
, '---' is normally a sign this is a YAML file.

Failed to parse inventory with 'ini' plugin.

<<< caused by >>>

Failed to parse inventory: Invalid host pattern '---' supplied, '---' is normally a sign this is a YAML file.
Origin: /workspaces/terraform_machine/inventory_aws_ec2.yaml

[WARNING]: Unable to parse /workspaces/terraform_machine/inventory_aws_ec2.yaml as an inventory source
[WARNING]: No inventory was parsed, only implicit localhost is available
[WARNING]: provided hosts list is empty, only localhost is available. Note that the implicit localhost does not match
'all'
[WARNING]: Could not match supplied host pattern, ignoring: tag_Name_prod_*

PLAY [Configure nginx web server] ****
skipping: no hosts matched

PLAY [Configure SSL certificates] ****
skipping: no hosts matched

PLAY [Deploy Nginx website and configuration files] ****
skipping: no hosts matched

PLAY RECAP ****
```

task12_ansible_play_t3_micro

```
@23-22411-061-rgb →/workspaces/terraform_machine (main) $ ansible-playbook -i inventory_aws_ec2.yaml -l instance_type_t3_micro my-playbook.yaml

Failed to parse inventory with 'ini' plugin.

<<< caused by >>>

Failed to parse inventory: Invalid host pattern '---' supplied, '---' is normally a sign this is a YAML file.
Origin: /workspaces/terraform_machine/inventory_aws_ec2.yaml

[WARNING]: Unable to parse /workspaces/terraform_machine/inventory_aws_ec2.yaml as an inventory source
[WARNING]: No inventory was parsed, only implicit localhost is available
[WARNING]: provided hosts list is empty, only localhost is available. Note that the implicit localhost does not match 'all'
[WARNING]: Could not match supplied host pattern, ignoring: instance_type_t3_micro

PLAY [Configure nginx web server] ****
skipping: no hosts matched

PLAY [Configure SSL certificates] ****
skipping: no hosts matched

PLAY [Deploy Nginx website and configuration files] ****
skipping: no hosts matched
```

task12_ansible_play_t3_nano

```
@23-22411-061-rgb →/workspaces/terraform_machine (main) $ ansible-playbook -i inventory_aws_ec2.yaml -l instance_type_t3_nano my-playbook.yaml
, '---' is normally a sign this is a YAML file.

Failed to parse inventory with 'ini' plugin.

<<< caused by >>>

Failed to parse inventory: Invalid host pattern '---' supplied, '---' is normally a sign this is a YAML file.
Origin: /workspaces/terraform_machine/inventory_aws_ec2.yaml

[WARNING]: Unable to parse /workspaces/terraform_machine/inventory_aws_ec2.yaml as an inventory source
[WARNING]: No inventory was parsed, only implicit localhost is available
[WARNING]: provided hosts list is empty, only localhost is available. Note that the implicit localhost does not match 'all'
[WARNING]: Could not match supplied host pattern, ignoring: instance_type_t3_nano

PLAY [Configure nginx web server] ****
skipping: no hosts matched

PLAY [Configure SSL certificates] ****
skipping: no hosts matched

PLAY [Deploy Nginx website and configuration files] ****
skipping: no hosts matched

PLAY RECAP ****
```

task12_ansible_cfg_inventory_default

```
[defaults]
host_key_checking=False
interpreter_python = /usr/bin/python3
deprecation_warnings=False
enable_plugins=aws_ec2
private_key_file=~/ssh/id_ed25519
inventory = ./inventory_aws_ec2.yaml
~
~
~
~
~
~
~
~
```

task12_ansible_play_t3_nano_no_i

```
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ ansible-playbook -l instance_type_t3.nano my-playbook.yaml
[WARNING]: Ansible is being run in a world writable directory (/workspaces/terraform_machine), ignoring it as an ansible.cfg source. For more information see https://docs.ansible.com/ansible-devel/reference_appendices/config.html#cfg-in-world-writable-dir
[WARNING]: No inventory was parsed, only implicit localhost is available
[WARNING]: provided hosts list is empty, only localhost is available. Note that the implicit localhost does not match 'all'
[WARNING]: Could not match supplied host pattern, ignoring: instance_type_t3.nano

PLAY [Configure nginx web server] ****
skipping: no hosts matched

PLAY [Configure SSL certificates] ****
skipping: no hosts matched

PLAY [Deploy Nginx website and configuration files] ****
skipping: no hosts matched

PLAY RECAP ****
```

Task 13 – Ansible roles: nginx, ssl, webapp

task13_main_tf_single_dev

```

vpc_id = aws_vpc.myapp_vpc.id
subnet_cidr_block = var.subnet_cidr_block
availability_zone = var.availability_zone
env_prefix = var.env_prefix
default_route_table_id = aws_vpc.myapp_vpc.default_route_table_id
}

module "myapp-webserver" {
  source          = "./modules/webserver"
  env_prefix      = var.env_prefix
  instance_type   = var.instance_type
  availability_zone = var.availability_zone
  public_key      = var.public_key
  my_ip           = local.my_ip
  vpc_id          = aws_vpc.myapp_vpc.id
  subnet_id       = module.myapp-subnet.subnet.id

  # Loop count
  count           = 1
  # Use count.index to differentiate instances
  instance_suffix = count.index
}
~
~
~
~
~
~
```
-- INSERT --

```

### task13\_ansible\_structure\_created

```

● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ vim main.tf
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ mkdir -p ansible
● @23-22411-061-rgb →/workspaces/terraform_machine (main) $ cd ansible
● @23-22411-061-rgb →/workspaces/terraform_machine/ansible (main) $ mkdir inventory roles
● @23-22411-061-rgb →/workspaces/terraform_machine/ansible (main) $ touch ansible.cfg my-playbook.yaml
● @23-22411-061-rgb →/workspaces/terraform_machine/ansible (main) $ ls -R
.:
ansible.cfg inventory my-playbook.yaml roles

./inventory:

./roles:
○ @23-22411-061-rgb →/workspaces/terraform_machine/ansible (main) $

```

### task13\_ansible\_cfg\_project

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

## task13\_ansible\_inventory\_hosts

```
[nginx]
51.112.187.163

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

### task13 roles created

```
@23-22411-061-rgb →/workspaces/terraform_machine/ansible (main) $ ls -R
./roles:
nginx ssl webapp

./roles/nginx:
README.md defaults files handlers meta tasks templates tests vars

./roles/nginx/defaults:
main.yml

./roles/nginx/files:
./roles/nginx/handlers:
main.yml

./roles/nginx/meta:
main.yml

./roles/nginx/tasks:
main.yml

./roles/nginx/templates:
./roles/nginx/tests:
inventory test.yml

./roles/nginx/vars:
main.yml

./roles/ssl:
README.md defaults files handlers meta tasks templates tests vars

./roles/ssl/defaults:
main.yml

./roles/ssl/files:
```

task13\_nginx\_handlers\_main

```
#SPDX-License-Identifier: MIT-0
handlers file for nginx

- name: Restart nginx
 service:
 name: nginx
 state: restarted
~
```

task13\_nginx\_tasks\_main

```
#SPDX-License-Identifier: MIT-0
tasks file for nginx

- name: Install nginx
 yum:
 name: nginx
 state: present
 update_cache: yes
 notify: Restart nginx

- name: Install openssl
 yum:
 name: openssl
 state: present

- name: Start and enable nginx
 service:
 name: nginx
 state: started
 enabled: true
~
~
~
```

### task13\_my\_playbook\_nginx\_only

```

- name: Deploy NGINX Web Stack with SSL and PHP
 hosts: nginx
 become: true
 roles:
 - nginx
~
~
~
~
~
~
~
~
~
```

### task13\_ansible\_play\_nginx\_only

```

● @23-22411-061-rgb → /workspaces/terraform_machine/ansible (main) $ ansible-playbook -i inventory/hosts my-playbook.yaml
1

PLAY [Deploy NGINX Web Stack with SSL and PHP] ****
TASK [Gathering Facts] ****
ok: [51.112.187.163]

TASK [nginx : Install nginx] ****
changed: [51.112.187.163]

TASK [nginx : Install openssl] ****
ok: [51.112.187.163]

TASK [nginx : Start and enable nginx] ****
changed: [51.112.187.163]

RUNNING HANDLER [nginx : Restart nginx] ****
changed: [51.112.187.163]

PLAY RECAP ****
51.112.187.163 : ok=5 changed=3 unreachable=0 failed=0 skipped=0 rescued=0 ignored=0

```

## task13\_nginx\_browser\_roles



## task13\_ssl\_defaults\_main

```
#SPDX-License-Identifier: MIT-0

defaults file for ssl
imdsv2_token_ttl: "3600"
ssl_days_valid: 365

~
~
~
~
~
~
~
~
~
~
~
~
~
```

## task13\_ssl\_tasks\_main

```
path: /etc/ssl/certs
state: directory
mode: '0755'

- name: Get IMDSv2 token
uri:
 url: http://169.254.169.254/latest/api/token
 method: PUT
 headers:
 X-aws-ec2-metadata-token-ttl-seconds: "{{ imdsv2_token_ttl }}"
 return_content: yes
register: imds_token

- name: Get public IP
uri:
 url: http://169.254.169.254/latest/meta-data/public-ipv4
 headers:
 X-aws-ec2-metadata-token: "{{ imds_token.content }}"
 return_content: yes
register: public_ip

- name: Save public IP as fact
set_fact:
 server_public_ip: "{{ public_ip.content }}"

- name: Generate self-signed certificate
command: >
 openssl req -x509 -nodes -days {{ ssl_days_valid }}
 -newkey rsa:2048
 -keyout /etc/ssl/private/selfsigned.key
 -out /etc/ssl/certs/selfsigned.crt
 -subj "/CN={{ server_public_ip }}"
 -addext "subjectAltName=IP:{{ server_public_ip }}"
args:
 creates: /etc/ssl/certs/selfsigned.crt
```

## task13 webapp defaults main

```

#SPDX-License-Identifier: MIT-0
defaults file for webapp
nginx_user: nginx
nginx_worker_processes: auto
nginx_worker_connections: 1024
nginx_error_log_level: notice

Webapp settings
web_root: /usr/share/nginx/html
web_index_file: index.php
~
~
~
~
~
```

## task13\_webapp\_files\_index\_php

```

}
.label {
 font-weight: bold;
 color: #ffd700;
}
.info a {
 color: white; /* same as other values */
 text-decoration: none; /* remove underline */
 font-weight: normal;
}

.info a:hover {
 text-decoration: underline; /* optional: underline on hover */
}
</style>
</head>
<body>
<div class="container">
<h1> Nginx Front End Web Server </h1>

<div class="info">Hostname: <?= htmlspecialchars($hostname) ?></div>
<div class="info">Instance ID: <?= htmlspecialchars($instance_id) ?></div>
<div class="info">Private IP: <?= htmlspecialchars($private_ip) ?></div>
<div class="info">Public IP: <?= htmlspecialchars($public_ip) ?></div>
<div class="info">Public DNS:
 <a href="https://<?= htmlspecialchars($public_dns) ?>" target="_blank">
 https://<?= htmlspecialchars($public_dns) ?>

</div>
<div class="info">Deployed: <?= $deployed_date ?></div>
<div class="info">Status: Active and Running</div>
<div class="info">Managed By: Terraform + Ansible</div>
</div>
</body>
</html>
```

## task13\_webapp\_handlers\_main

```
#SPDX-License-Identifier: MIT-0
handlers file for webapp

- name: Restart nginx
 service:
 name: nginx
 state: restarted

- name: Restart php-fpm
 service:
 name: php-fpm
 state: restarted

~
~
~
```

task13\_webapp\_templates\_nginx\_conf

```
}

server {
 listen 443 ssl;
 server_name {{ server_public_ip }};

 ssl_certificate /etc/ssl/certs/selfsigned.crt;
 ssl_certificate_key /etc/ssl/private/selfsigned.key;

 location / {
 root {{ web_root }};
 index {{ web_index_file }} index.html index.htm;
 # proxy_pass http://158.252.94.241:80;
 # proxy_pass http://backend_servers;

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

 # This block is necessary for Php Website
 location ~ \.php$ {
 include fastcgi_params;
 fastcgi_pass unix:/run/php-fpm/www.sock;
 fastcgi_index index.php;
 fastcgi_param SCRIPT_FILENAME $document_root$fastcgi_script_name;
 }
}

server {
 listen 80;
 server_name _;
 return 301 https://$host$request_uri;
}

-- INSERT --
△ 0 ⌂ 0 62,2
```

task13\_webapp\_tasks\_main

```
#SPDX-License-Identifier: MIT-0
tasks file for webapp

- name: Install PHP packages
 yum:
 name:
 - php-fpm
 - php-curl
 state: present
 notify: Restart php-fpm

- name: Copy PHP website
 copy:
 src: index.php
 dest: "{{ web_root }}/{{ web_index_file }}"
 owner: nginx
 group: nginx
 mode: '0644'
 notify: Restart nginx

- name: Deploy nginx config
 template:
 src: nginx.conf.j2
 dest: /etc/nginx/nginx.conf
 notify: Restart nginx

- name: Start and enable php-fpm
 service:
 name: php-fpm
 state: started
 enabled: true
```

task13\_my\_playbook\_roles

```

- name: Deploy NGINX Web Stack with SSL and PHP
 hosts: nginx
 become: true
 roles:
 - nginx
 - ssl
 - webapp
~
```

## task13\_ansible\_play\_roles

```

@23-22411-061-rgb → /workspaces/terraform_machine/ansible (main) $ ansible-playbook -i inventory/hosts my-playbook.yaml
1
TASK [ssl : Get IMDSv2 token] *****
ok: [51.112.187.163]

TASK [ssl : Get public IP] *****
ok: [51.112.187.163]

TASK [ssl : Save public IP as fact] *****
ok: [51.112.187.163]

TASK [ssl : Generate self-signed certificate] *****
changed: [51.112.187.163]

TASK [webapp : Install PHP packages] *****
changed: [51.112.187.163]

TASK [webapp : Copy PHP website] *****
changed: [51.112.187.163]

TASK [webapp : Deploy nginx config] *****
changed: [51.112.187.163]

TASK [webapp : Start and enable php-fpm] *****
changed: [51.112.187.163]

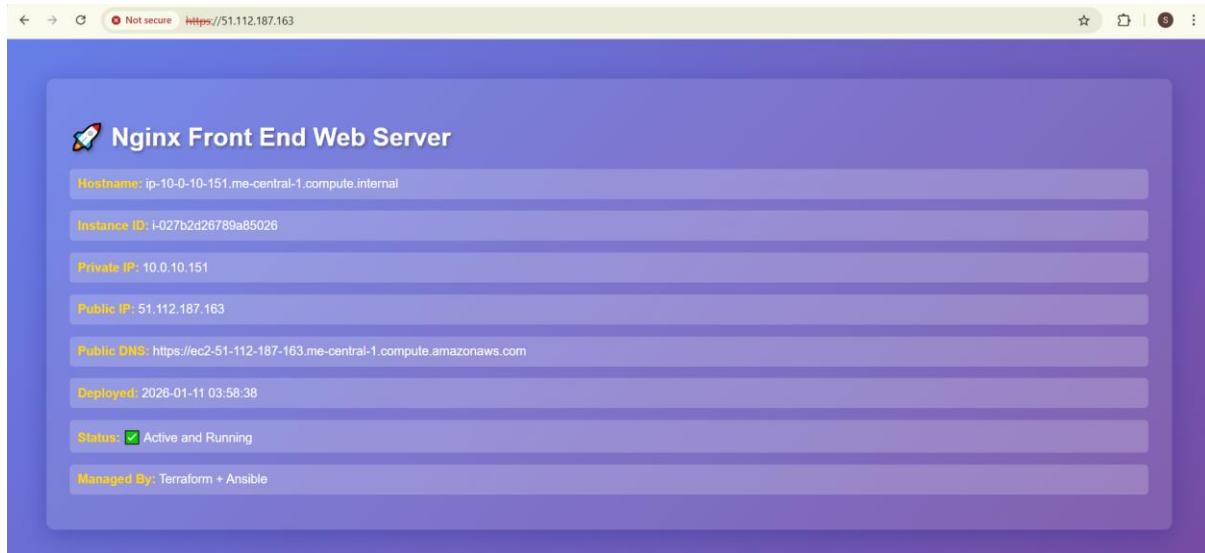
RUNNING HANDLER [webapp : Restart nginx] *****
changed: [51.112.187.163]

RUNNING HANDLER [webapp : Restart php-fpm] *****
changed: [51.112.187.163]

PLAY RECAP *****
51.112.187.163 : ok=16 changed=9 unreachable=0 failed=0 skipped=0 rescued=0 ignored=0

@23-22411-061-rgb → /workspaces/terraform_machine/ansible (main) $
```

## task13\_php\_https\_browser\_roles



## Cleanup

cleanup\_terraform\_destroy

```
@23-22411-061-rgb → /workspaces/terraform_machine (main) $ terraform destroy -auto-approve
Changes to Outputs:
 - webserver_public_ips = [
 - "51.112.187.163",
] -> null
module.myapp-subnet.aws_default_route_table.main_rt: Destroying... [id=rtb-04fafaa3b7f7448d2]
module.myapp-subnet.aws_default_route_table.main_rt: Destruction complete after 0s
module.myapp-webserver[0].aws_instance.myapp-server: Destroying... [id=i-027b2d26789a85026]
module.myapp-subnet.aws_internet_gateway.myapp_igw: Destroying... [id=igw-0c3987611177dfeae]
module.myapp-webserver[0].aws_instance.myapp-server: Still destroying... [id=i-027b2d26789a85026, 00m10s elapsed]
module.myapp-subnet.aws_internet_gateway.myapp_igw: Still destroying... [id=igw-0c3987611177dfeae, 00m10s elapsed]
module.myapp-webserver[0].aws_instance.myapp-server: Still destroying... [id=i-027b2d26789a85026, 00m20s elapsed]
module.myapp-subnet.aws_internet_gateway.myapp_igw: Still destroying... [id=igw-0c3987611177dfeae, 00m20s elapsed]
module.myapp-subnet.aws_internet_gateway.myapp_igw: Destruction complete after 27s
module.myapp-webserver[0].aws_instance.myapp-server: Still destroying... [id=i-027b2d26789a85026, 00m30s elapsed]
module.myapp-webserver[0].aws_instance.myapp-server: Still destroying... [id=i-027b2d26789a85026, 00m40s elapsed]
module.myapp-webserver[0].aws_instance.myapp-server: Destruction complete after 40s
module.myapp-webserver[0].aws_key_pair.ssh-key: Destroying... [id=dev-serverkey-0]
module.myapp-subnet.aws_subnet.myapp_subnet_1: Destroying... [id=subnet-0813aebf3e598c571]
module.myapp-webserver[0].aws_security_group.web_sg: Destroying... [id=sg-0863b9335d553f9c5]
module.myapp-webserver[0].aws_key_pair.ssh-key: Destruction complete after 1s
module.myapp-subnet.aws_subnet.myapp_subnet_1: Destruction complete after 1s
module.myapp-webserver[0].aws_security_group.web_sg: Destruction complete after 1s
aws_vpc.myapp_vpc: Destroying... [id=vpc-055f6a948d2b2ea0d]
aws_vpc.myapp_vpc: Destruction complete after 1s

Destroy complete! Resources: 7 destroyed.
```

cleanup\_tfstate

```
► @23-22411-061-rgb → /workspaces/terraform_machine (main) $ cat terraform.tfstate
{
 "version": 4,
 "terraform_version": "1.14.3",
 "serial": 162,
 "lineage": "79a3d985-8aeb-25f2-27d4-efef1545a1be",
 "outputs": {},
 "resources": [],
 "check_results": null
}
```

## cleanup\_aws\_console

Instances (2) <a href="#">Info</a>		<a href="#">Connect</a>	Instance state ▾	Actions ▾	Launch instances ▾			
		All states ▾		< 1 >				
<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IP
<input type="checkbox"/>	dev-ec2-insta...	<a href="#">i-027b2d26789a85026</a>	Terminated	t3.micro	-	<a href="#">View alarms +</a>	me-central-1a	-
<input type="checkbox"/>	prod-ec2-insta...	<a href="#">i-02dd29264b6acb6aa</a>	Terminated	t3.nano	-	<a href="#">View alarms +</a>	me-central-1a	-