Fatima Jinnah Women University

Opening Portals of Excellence Through Higher Education

Open Ended lab + lab Project

Project :Terraform + Ansible Roles: Nginx Frontend with 3 Backend HTTPD Servers (HA + Auto-Config)

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Roll No: 2023-BSE-077

Subject: Cloud Computing

Class: BSE5-B

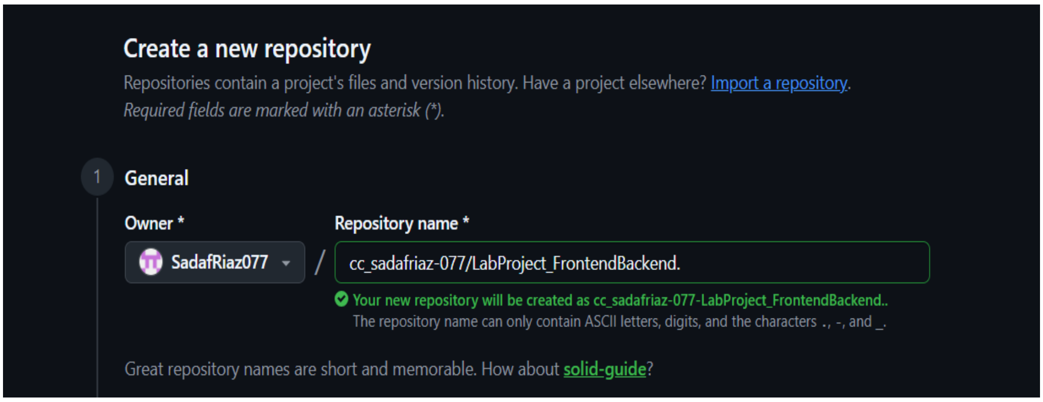
Instructor: Sir Shoaib

Due Date: 17 Jan 2026

Repo link:

https://github.com/SadafRiaz077/cc_sadafriaz-077-LabProject_FrontendBackend

GitHub Repository Creation



Create a new repository

Repositories contain a project's files and version history. Have a project elsewhere? Import a repository.

Required fields are marked with an asterisk (*).

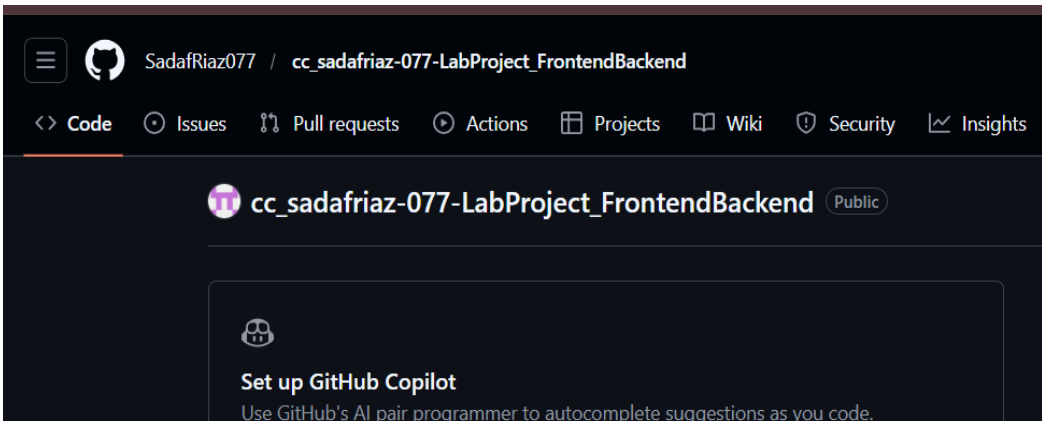
1 General

Owner * SadafRiaz077 / Repository name * cc_sadafriaz-077/LabProject_FrontendBackend.

Your new repository will be created as cc_sadafriaz-077-LabProject_FrontendBackend..

The repository name can only contain ASCII letters, digits, and the characters ., -, and _.

Great repository names are short and memorable. How about solid-guide?



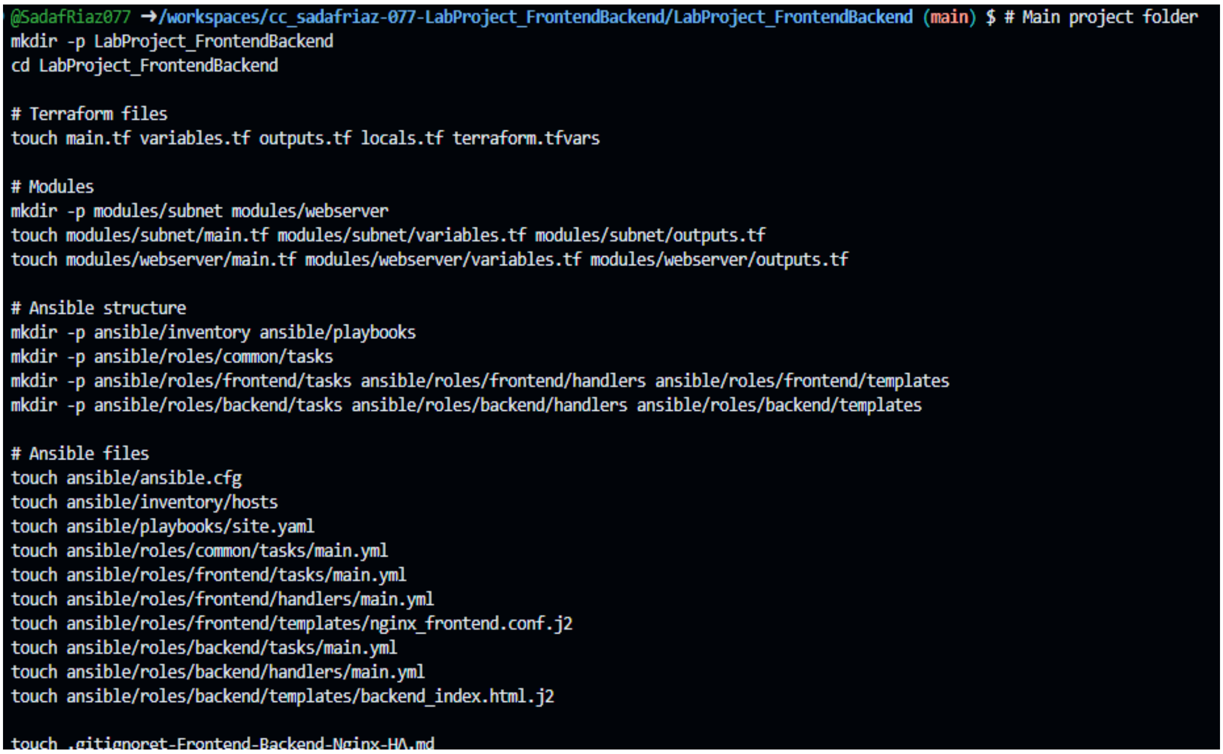
SadafRiaz077 / cc_sadafriaz-077-LabProject_FrontendBackend

cc_sadafriaz-077-LabProject_FrontendBackend Public

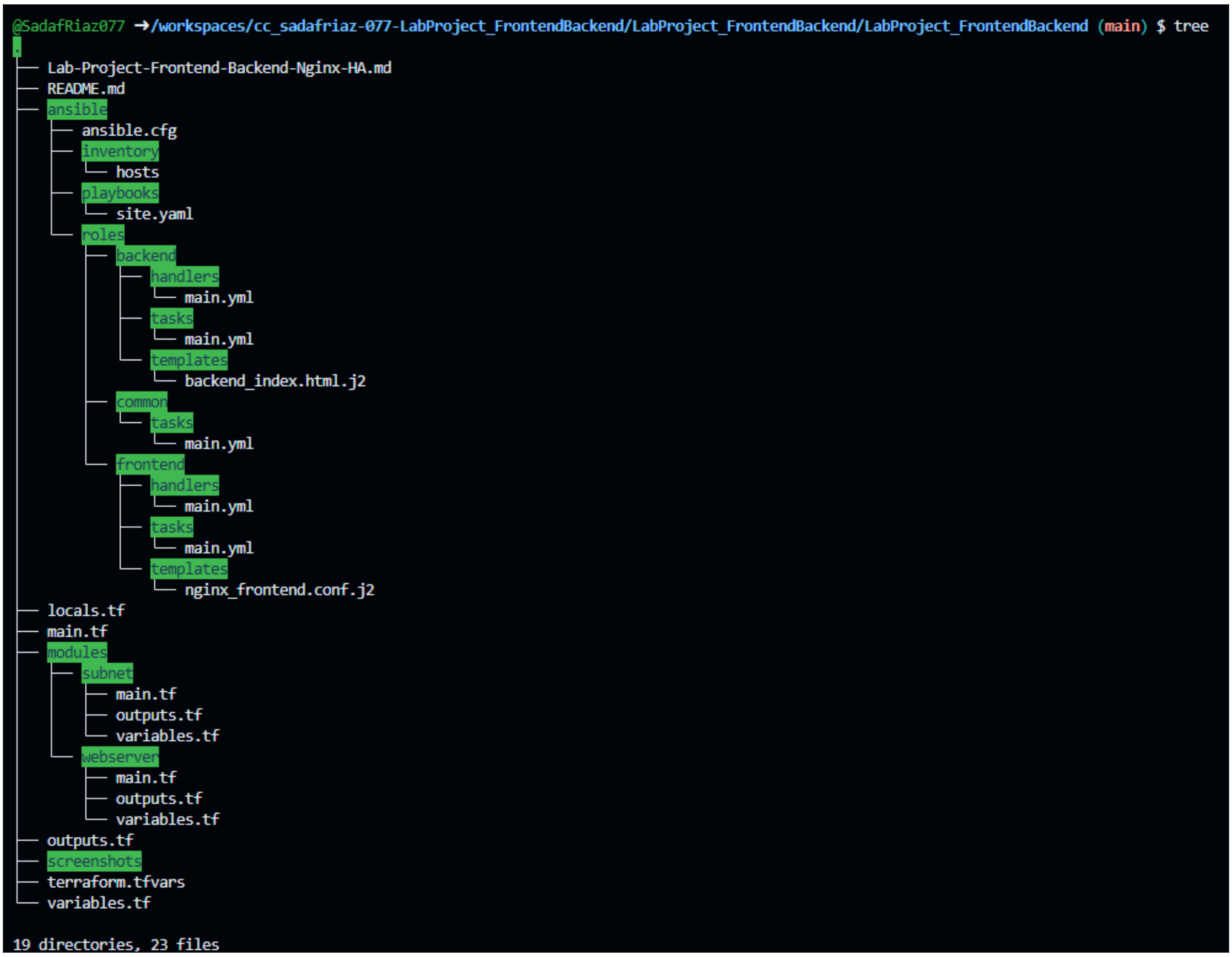
Set up GitHub Copilot

Use GitHub's AI pair programmer to autocomplete suggestions as you code.

Structure:

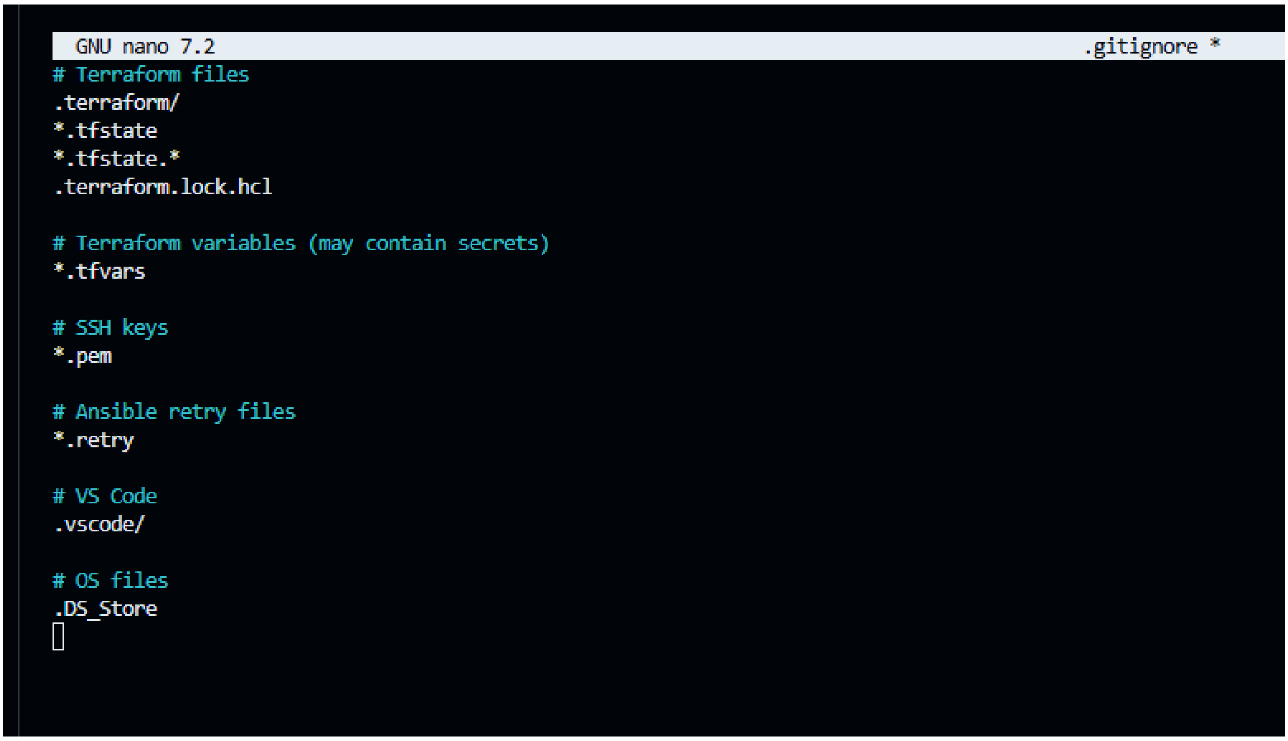


```
@SadafRiaz077 ➜/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ # Main project folder
mkdir -p LabProject_FrontendBackend
cd LabProject_FrontendBackend

# Terraform files
touch main.tf variables.tf outputs.tf locals.tf terraform.tfvars

# Modules
mkdir -p modules/subnet modules/webserver
touch modules/subnet/main.tf modules/subnet/variables.tf modules/subnet/outputs.tf
touch modules/webserver/main.tf modules/webserver/variables.tf modules/webserver/outputs.tf

# Ansible structure
mkdir -p ansible/inventory ansible/playbooks
mkdir -p ansible/roles/common/tasks
mkdir -p ansible/roles/frontend/tasks ansible/roles/frontend/handlers ansible/roles/frontend/templates
mkdir -p ansible/roles/backend/tasks ansible/roles/backend/handlers ansible/roles/backend/templates

# Ansible files
touch ansible/ansible.cfg
touch ansible/inventory/hosts
touch ansible/playbooks/site.yaml
touch ansible/roles/common/tasks/main.yml
touch ansible/roles/frontend/tasks/main.yml
touch ansible/roles/frontend/handlers/main.yml
touch ansible/roles/frontend/templates/nginx_frontend.conf.j2
touch ansible/roles/backend/tasks/main.yml
touch ansible/roles/backend/handlers/main.yml
touch ansible/roles/backend/templates/backend_index.html.j2

touch .gitignoret-Frontend-Backend-Nginx-HA.md
```



```
@SadafRiaz077 ➜ /workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ tree
.
├── Lab-Project-Frontend-Backend-Nginx-HA.md
├── README.md
├── ansible
│   ├── ansible.cfg
│   ├── inventory
│   │   └── hosts
│   ├── playbooks
│   │   └── site.yaml
│   └── roles
│       ├── backend
│       │   ├── handlers
│       │   │   └── main.yml
│       │   ├── tasks
│       │   │   └── main.yml
│       │   └── templates
│       │       └── backend_index.html.j2
│       ├── common
│       │   └── tasks
│       │       └── main.yml
│       └── frontend
│           ├── handlers
│           │   └── main.yml
│           ├── tasks
│           │   └── main.yml
│           └── templates
│               └── nginx_frontend.conf.j2
├── locals.tf
├── main.tf
├── modules
│   ├── subnet
│   │   ├── main.tf
│   │   ├── outputs.tf
│   │   └── variables.tf
│   └── webserver
│       ├── main.tf
│       ├── outputs.tf
│       └── variables.tf
├── outputs.tf
├── screenshots
├── terraform.tfvars
└── variables.tf

19 directories, 23 files
```

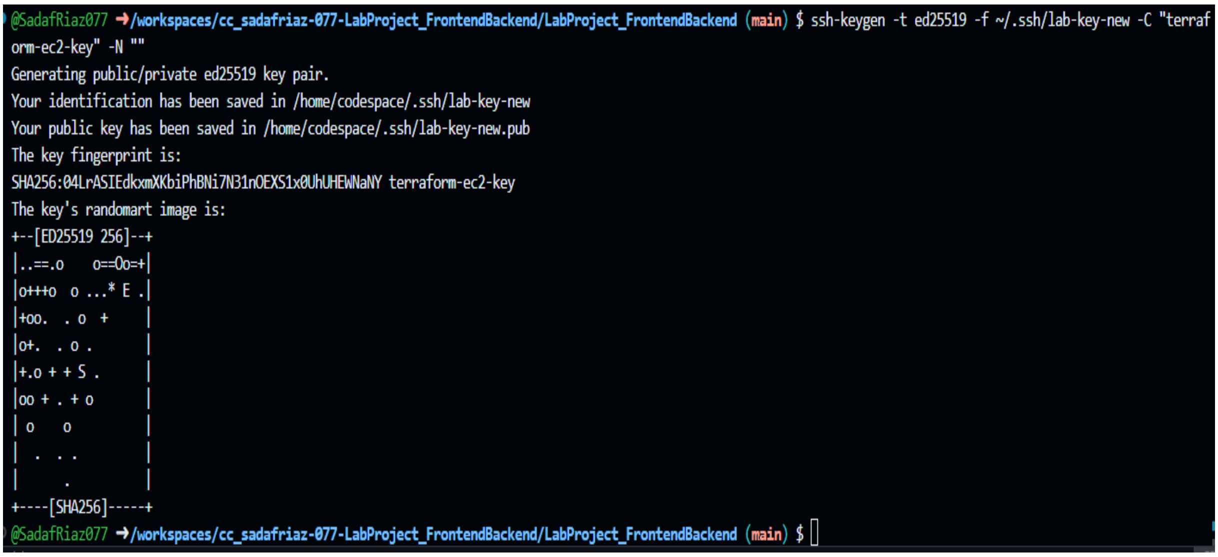
.gitignore



```
  GNU nano 7.2                                                        .gitignore *
# Terraform files
.terraform/
*.tfstate
*.tfstate.*
.terraform.lock.hcl

# Terraform variables (may contain secrets)
*.tfvars

# SSH keys
*.pem

# Ansible retry files
*.retry

# VS Code
.vscode/

# OS files
.DS_Store
```

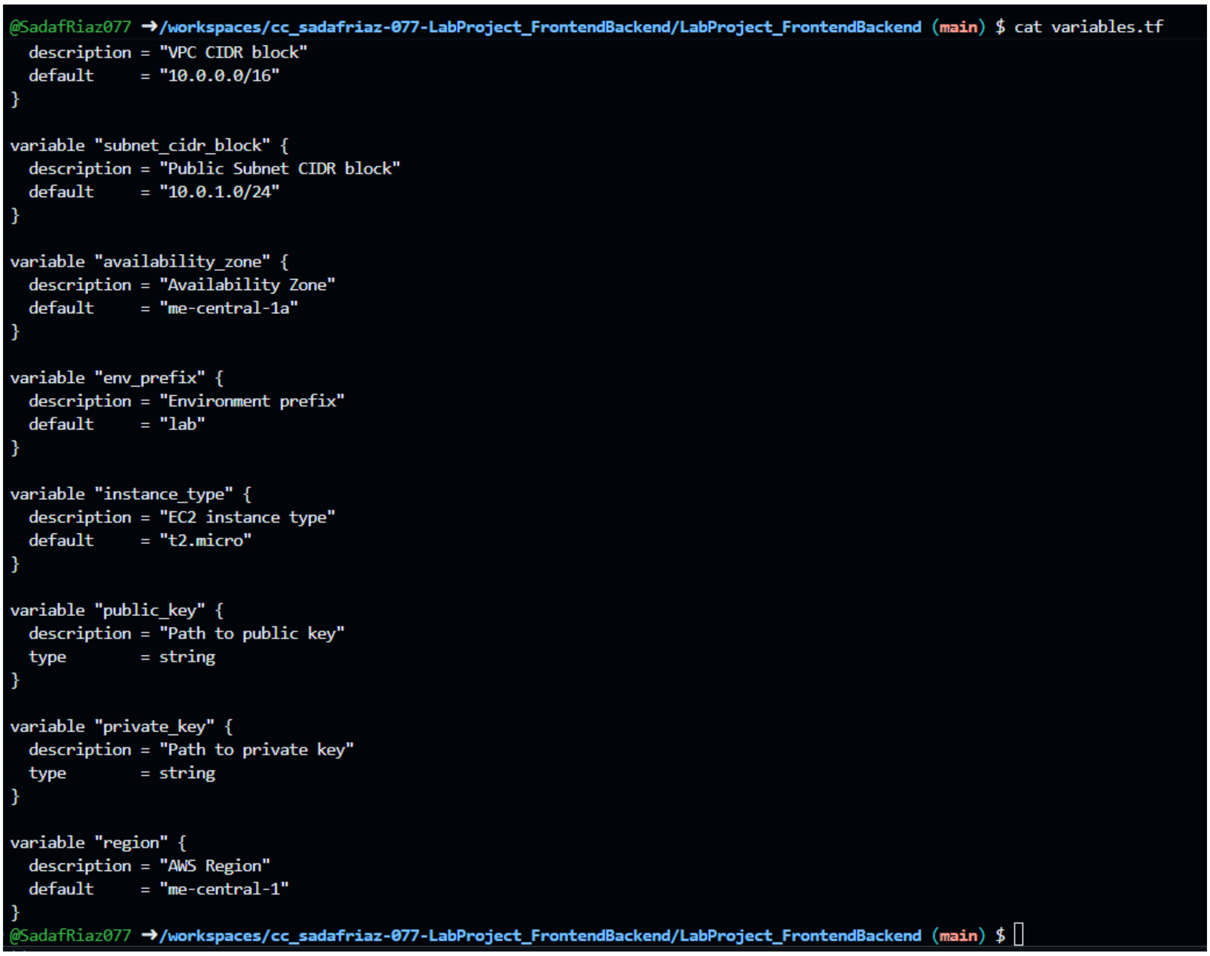
1.Terraform – Networking & Common Settings

Generate Key



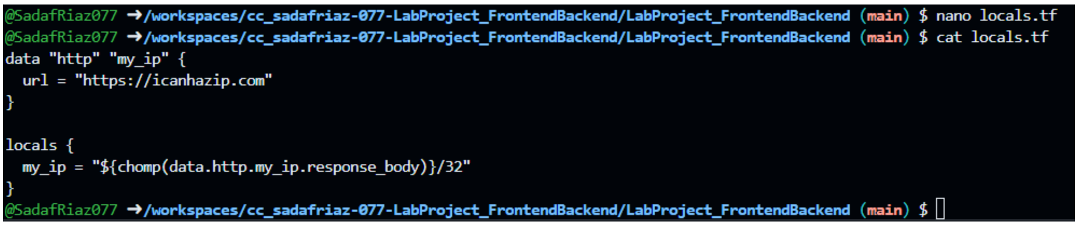
```
@SadafRiaz077 ➜/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ ssh-keygen -t ed25519 -f ~/.ssh/lab-key-new -C "terraf
orm-ec2-key" -N ""
Generating public/private ed25519 key pair.
Your identification has been saved in /home/codespace/.ssh/lab-key-new
Your public key has been saved in /home/codespace/.ssh/lab-key-new.pub
The key fingerprint is:
SHA256:04LrASIEdkxmXKbiPhBNi7N31nOEXS1x0UhUHEWNaNY terraform-ec2-key
The key's randomart image is:
+--[ED25519 256]--+
|..==.o    o==Oo=+|
|o+++o  o ...* E .|
|+oo.  . o  +     |
|o+.  . o .       |
|+.o + + S .      |
|oo + . + o       |
| o    o          |
|  .  . .         |
|      .          |
+----[SHA256]-----+
@SadafRiaz077 ➜/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ 
```

variables.tf



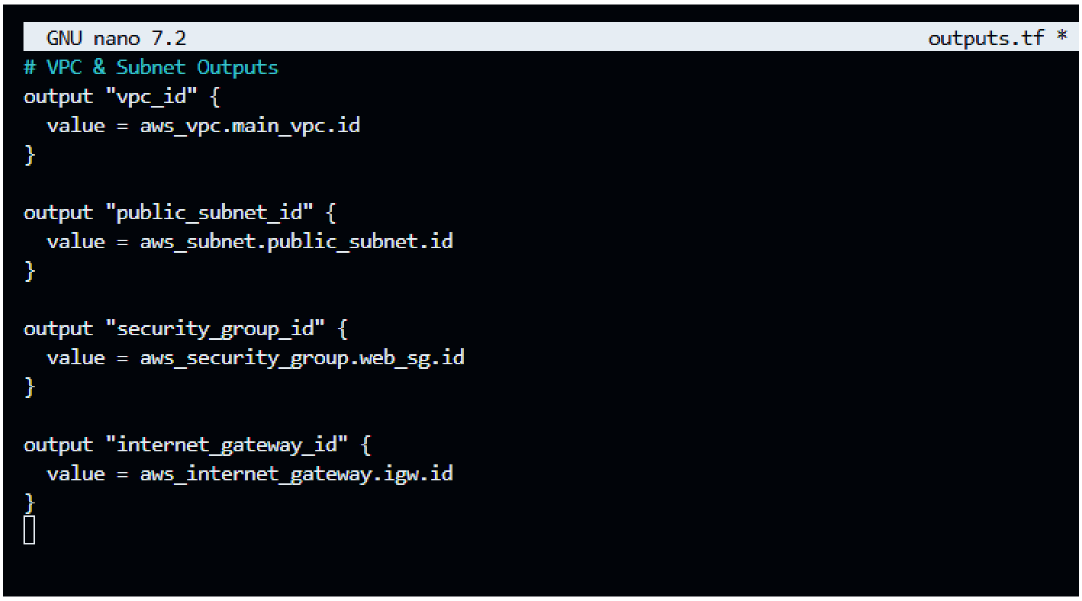
```
@SadafRiaz077 ➜/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ cat variables.tf
  description = "VPC CIDR block"
  default     = "10.0.0.0/16"
}

variable "subnet_cidr_block" {
  description = "Public Subnet CIDR block"
  default     = "10.0.1.0/24"
}

variable "availability_zone" {
  description = "Availability Zone"
  default     = "me-central-1a"
}

variable "env_prefix" {
  description = "Environment prefix"
  default     = "lab"
}

variable "instance_type" {
  description = "EC2 instance type"
  default     = "t2.micro"
}

variable "public_key" {
  description = "Path to public key"
  type        = string
}

variable "private_key" {
  description = "Path to private key"
  type        = string
}

variable "region" {
  description = "AWS Region"
  default     = "me-central-1"
}
@SadafRiaz077 ➜/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ 
```

locals.tf



```
@SadafRiaz077 →/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ nano locals.tf
@SadafRiaz077 →/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ cat locals.tf
data "http" "my_ip" {
  url = "https://icanhazip.com"
}

locals {
  my_ip = "${chomp(data.http.my_ip.response_body)}/32"
}
@SadafRiaz077 →/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $
```

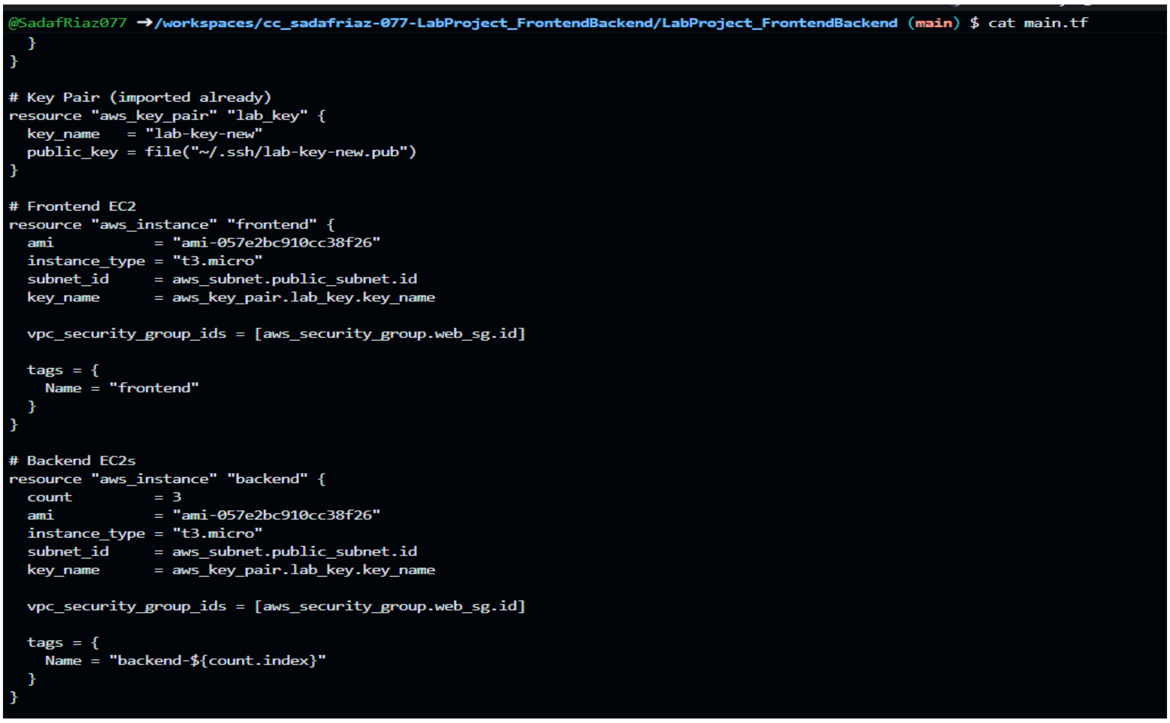
Outputs.tf



```
  GNU nano 7.2                                                              outputs.tf *
# VPC & Subnet Outputs
output "vpc_id" {
  value = aws_vpc.main_vpc.id
}

output "public_subnet_id" {
  value = aws_subnet.public_subnet.id
}

output "security_group_id" {
  value = aws_security_group.web_sg.id
}

output "internet_gateway_id" {
  value = aws_internet_gateway.igw.id
}
```

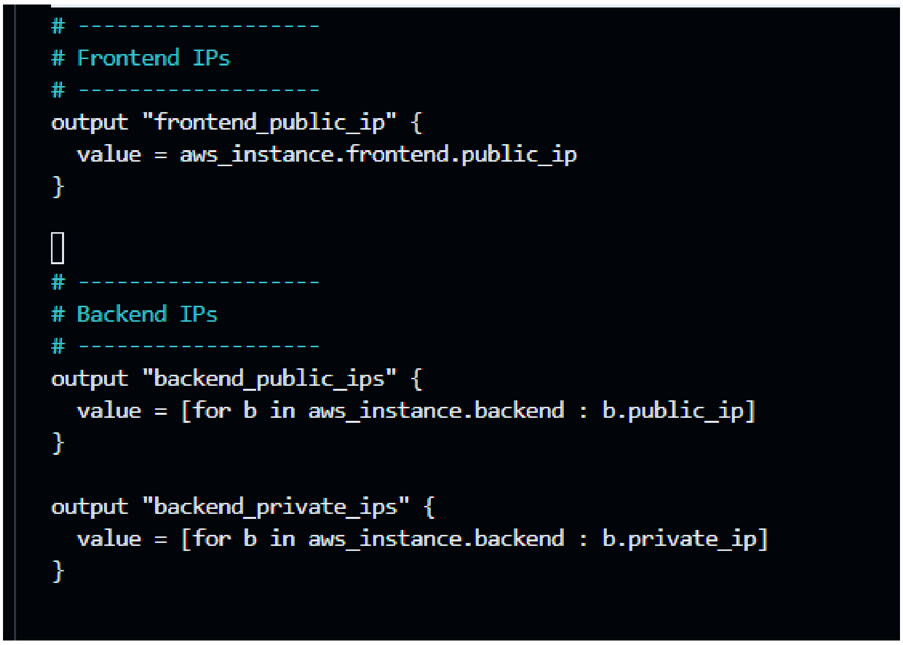
Step 2: Terraform Configuration Files

main.tf



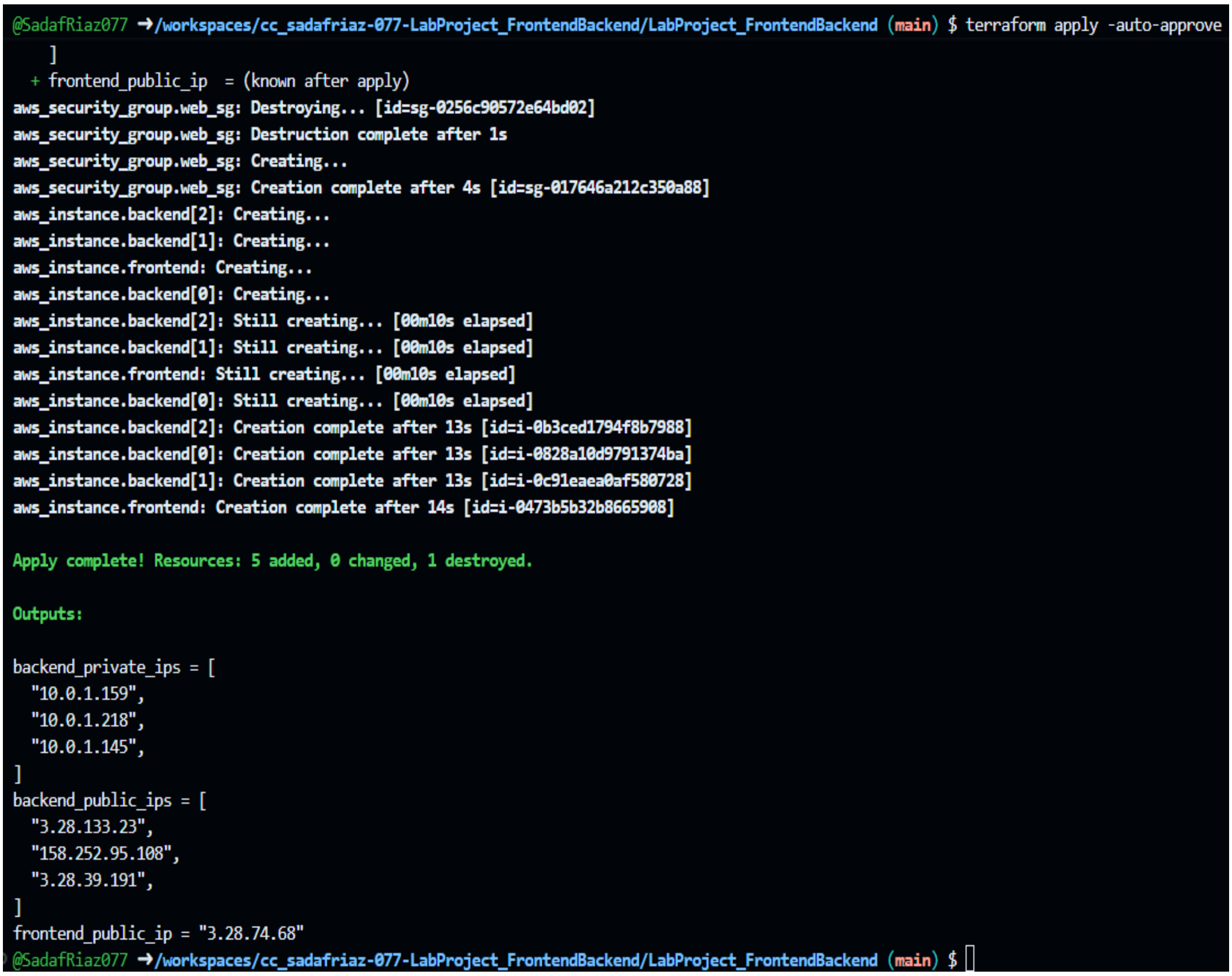
```
@SadafRiaz077 →/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ cat main.tf
  }
}

# Key Pair (imported already)
resource "aws_key_pair" "lab_key" {
  key_name   = "lab-key-new"
  public_key = file("~/.ssh/lab-key-new.pub")
}

# Frontend EC2
resource "aws_instance" "frontend" {
  ami           = "ami-057e2bc910cc38f26"
  instance_type = "t3.micro"
  subnet_id     = aws_subnet.public_subnet.id
  key_name      = aws_key_pair.lab_key.key_name

  vpc_security_group_ids = [aws_security_group.web_sg.id]

  tags = {
    Name = "frontend"
  }
}

# Backend EC2s
resource "aws_instance" "backend" {
  count         = 3
  ami           = "ami-057e2bc910cc38f26"
  instance_type = "t3.micro"
  subnet_id     = aws_subnet.public_subnet.id
  key_name      = aws_key_pair.lab_key.key_name

  vpc_security_group_ids = [aws_security_group.web_sg.id]

  tags = {
    Name = "backend-${count.index}"
  }
}
```

Outputs.tf



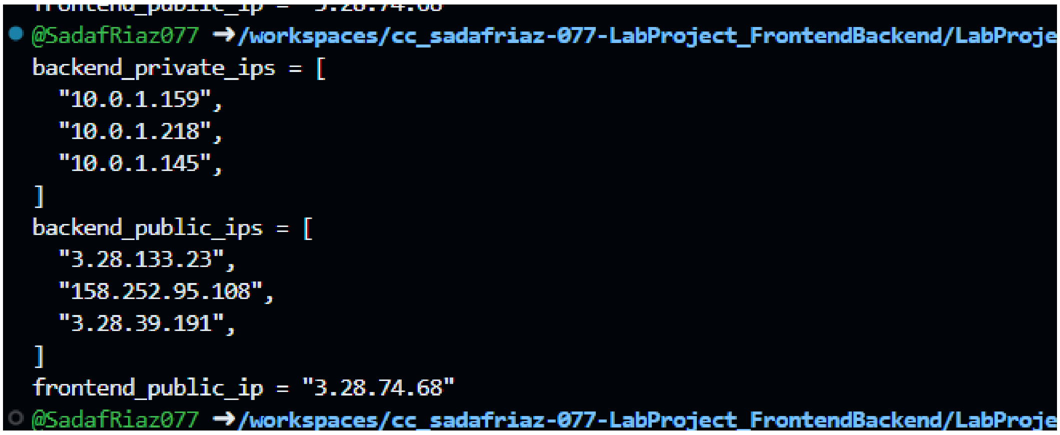
```
# -------------------
# Frontend IPs
# -------------------
output "frontend_public_ip" {
  value = aws_instance.frontend.public_ip
}


# -------------------
# Backend IPs
# -------------------
output "backend_public_ips" {
  value = [for b in aws_instance.backend : b.public_ip]
}

output "backend_private_ips" {
  value = [for b in aws_instance.backend : b.private_ip]
}
```

terraform apply -auto-approve



```
@SadafRiaz077 ➜ /workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ terraform apply -auto-approve
    ]
  + frontend_public_ip  = (known after apply)
aws_security_group.web_sg: Destroying... [id=sg-0256c90572e64bd02]
aws_security_group.web_sg: Destruction complete after 1s
aws_security_group.web_sg: Creating...
aws_security_group.web_sg: Creation complete after 4s [id=sg-017646a212c350a88]
aws_instance.backend[2]: Creating...
aws_instance.backend[1]: Creating...
aws_instance.frontend: Creating...
aws_instance.backend[0]: Creating...
aws_instance.backend[2]: Still creating... [00m10s elapsed]
aws_instance.backend[1]: Still creating... [00m10s elapsed]
aws_instance.frontend: Still creating... [00m10s elapsed]
aws_instance.backend[0]: Still creating... [00m10s elapsed]
aws_instance.backend[2]: Creation complete after 13s [id=i-0b3ced1794f8b7988]
aws_instance.backend[0]: Creation complete after 13s [id=i-0828a10d9791374ba]
aws_instance.backend[1]: Creation complete after 13s [id=i-0c91eaea0af580728]
aws_instance.frontend: Creation complete after 14s [id=i-0473b5b32b8665908]

Apply complete! Resources: 5 added, 0 changed, 1 destroyed.

Outputs:

backend_private_ips = [
  "10.0.1.159",
  "10.0.1.218",
  "10.0.1.145",
]
backend_public_ips = [
  "3.28.133.23",
  "158.252.95.108",
  "3.28.39.191",
]
frontend_public_ip = "3.28.74.68"
@SadafRiaz077 ➜ /workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $
```

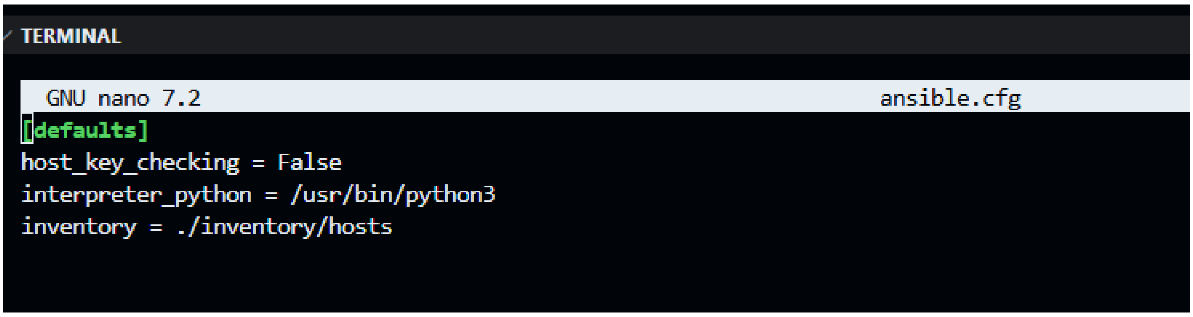
terraform output:



```
frontend_public_ip = "3.28.74.68"
● @SadafRiaz077 ➜/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProje
  backend_private_ips = [
    "10.0.1.159",
    "10.0.1.218",
    "10.0.1.145",
  ]
  backend_public_ips = [
    "3.28.133.23",
    "158.252.95.108",
    "3.28.39.191",
  ]
  frontend_public_ip = "3.28.74.68"
○ @SadafRiaz077 ➜/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProje
```

3.Ansible Configuration

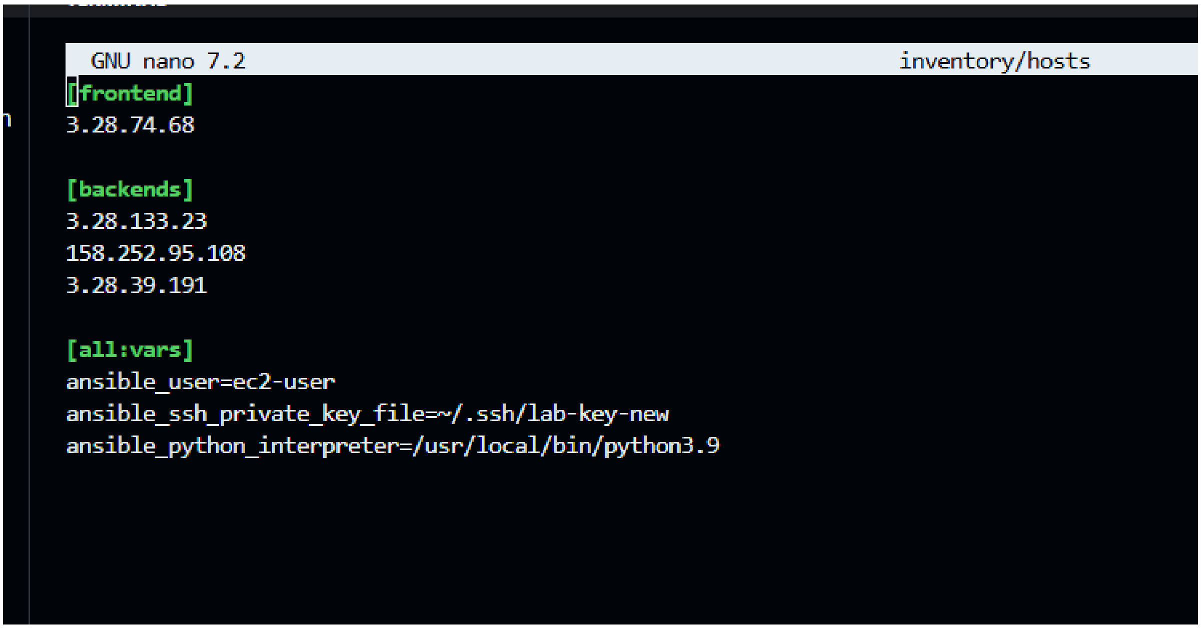
ansible/ansible.cfg



```
  GNU nano 7.2                                                    ansible.cfg
[defaults]
host_key_checking = False
interpreter_python = /usr/bin/python3
inventory = ./inventory/hosts
```

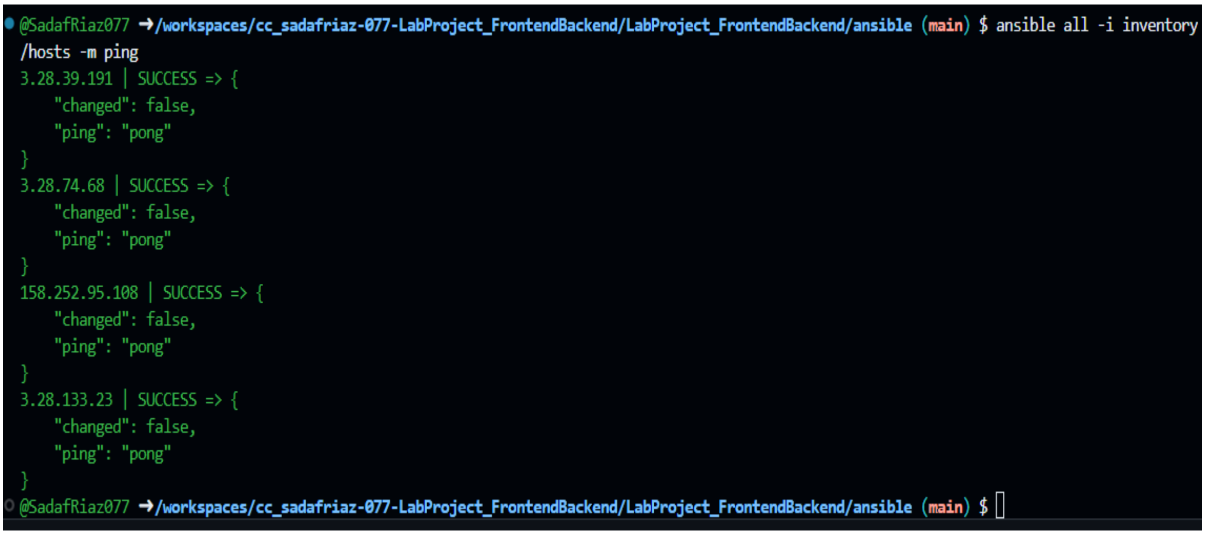
Inventory (Static)

ansible/inventory/hosts



```
  GNU nano 7.2                                                    inventory/hosts
[frontend]
3.28.74.68

[backends]
3.28.133.23
158.252.95.108
3.28.39.191

[all:vars]
ansible_user=ec2-user
ansible_ssh_private_key_file=~/.ssh/lab-key-new
ansible_python_interpreter=/usr/local/bin/python3.9
```

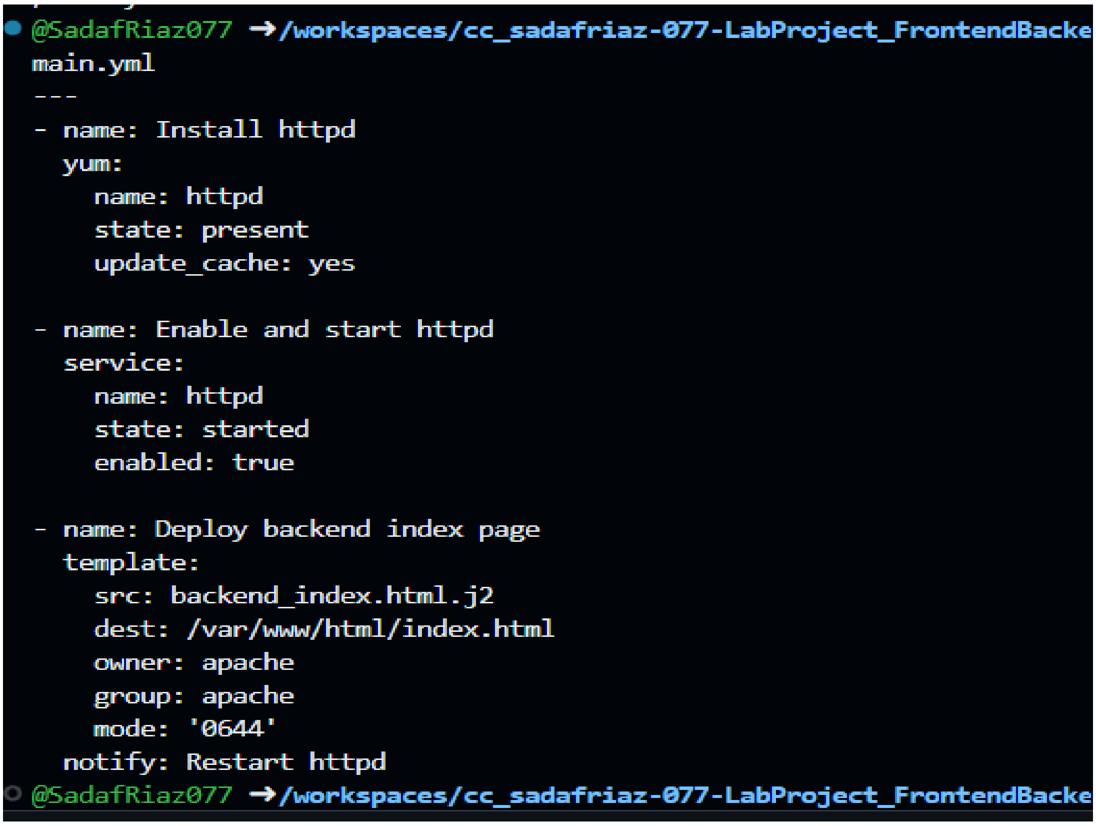
Ping:



```
@SadafRiaz077 →/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend/ansible (main) $ ansible all -i inventory
/hosts -m ping
3.28.39.191 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
3.28.74.68 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
158.252.95.108 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
3.28.133.23 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
@SadafRiaz077 →/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend/ansible (main) $
```

4.Backend Role

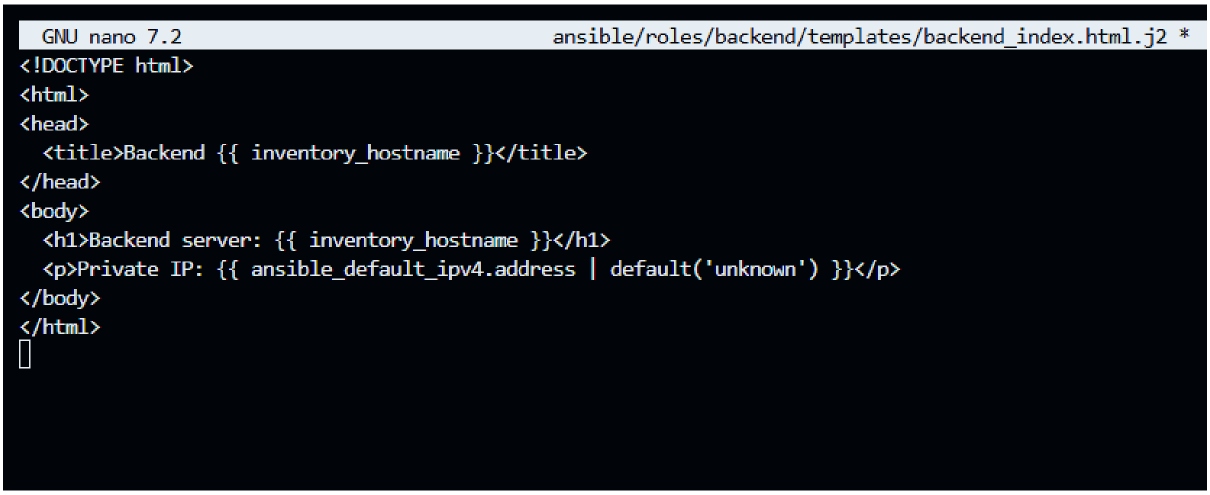
Backend Tasks File
roles/backend/tasks/main.yml



```
@SadafRiaz077 →/workspaces/cc_sadafriaz-077-LabProject_FrontendBacke
main.yml
---
- name: Install httpd
  yum:
    name: httpd
    state: present
    update_cache: yes

- name: Enable and start httpd
  service:
    name: httpd
    state: started
    enabled: true

- name: Deploy backend index page
  template:
    src: backend_index.html.j2
    dest: /var/www/html/index.html
    owner: apache
    group: apache
    mode: '0644'
  notify: Restart httpd
@SadafRiaz077 →/workspaces/cc_sadafriaz-077-LabProject_FrontendBacke
```

Backend template

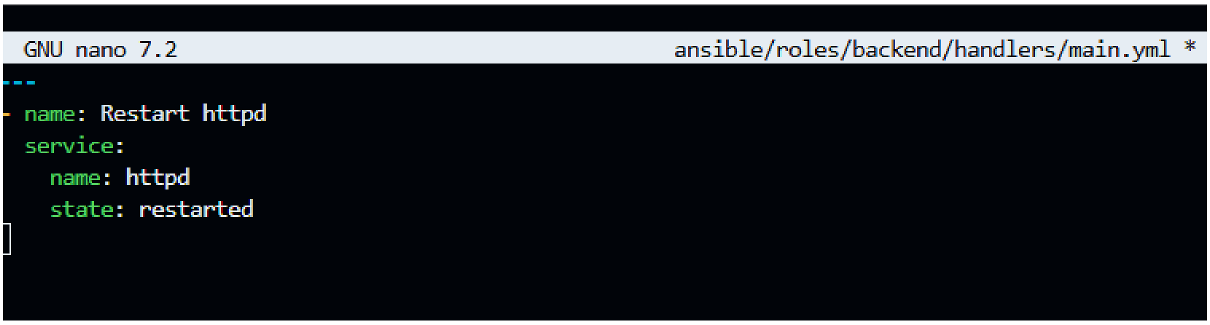
nano roles/backend/templates/backend_index.html.j2



```
  GNU nano 7.2                                ansible/roles/backend/templates/backend_index.html.j2 *
<!DOCTYPE html>
<html>
<head>
  <title>Backend {{ inventory_hostname }}</title>
</head>
<body>
  <h1>Backend server: {{ inventory_hostname }}</h1>
  <p>Private IP: {{ ansible_default_ipv4.address | default('unknown') }}</p>
</body>
</html>
```

Backend handler (optional)

nano roles/backend/handlers/main.yml

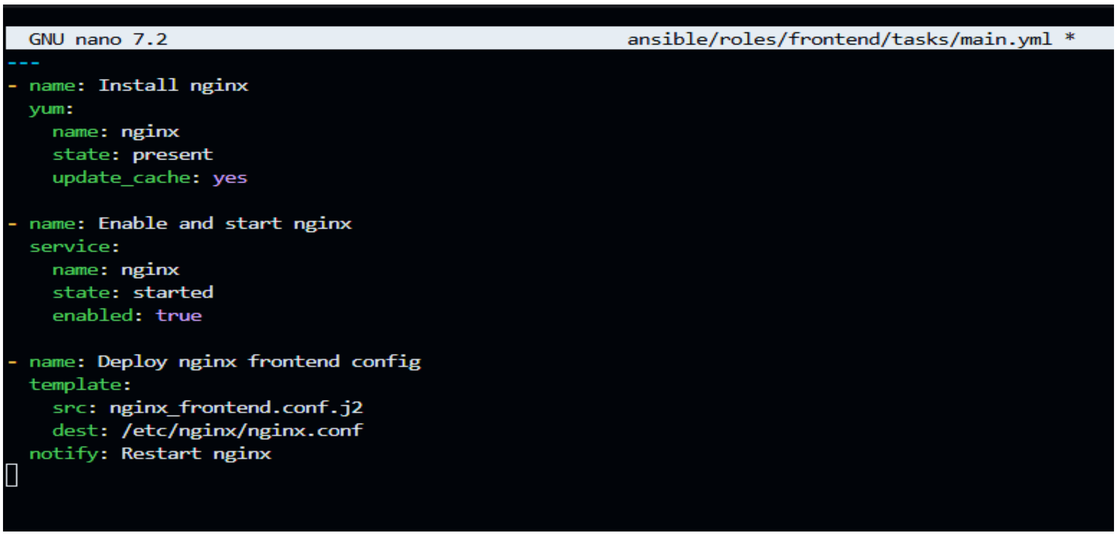


```
 GNU nano 7.2                                  ansible/roles/backend/handlers/main.yml *
---
- name: Restart httpd
  service:
    name: httpd
    state: restarted
```

5.Frontend Role

Frontend Tasks File

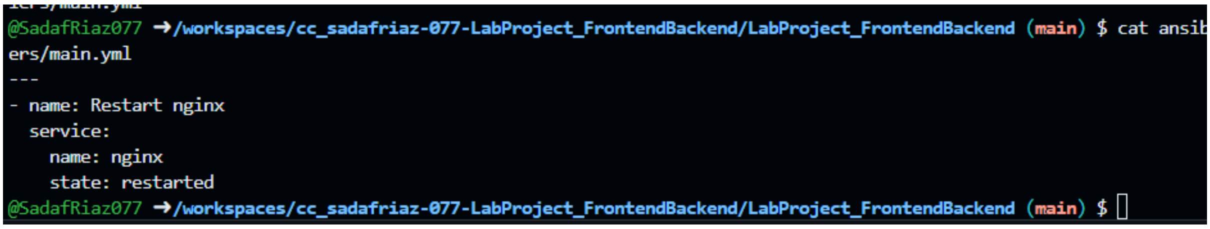
roles/frontend/tasks/main.yml



```
 GNU nano 7.2                                       ansible/roles/frontend/tasks/main.yml *
---
- name: Install nginx
  yum:
    name: nginx
    state: present
    update_cache: yes

- name: Enable and start nginx
  service:
    name: nginx
    state: started
    enabled: true

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

Frontend Handlers File

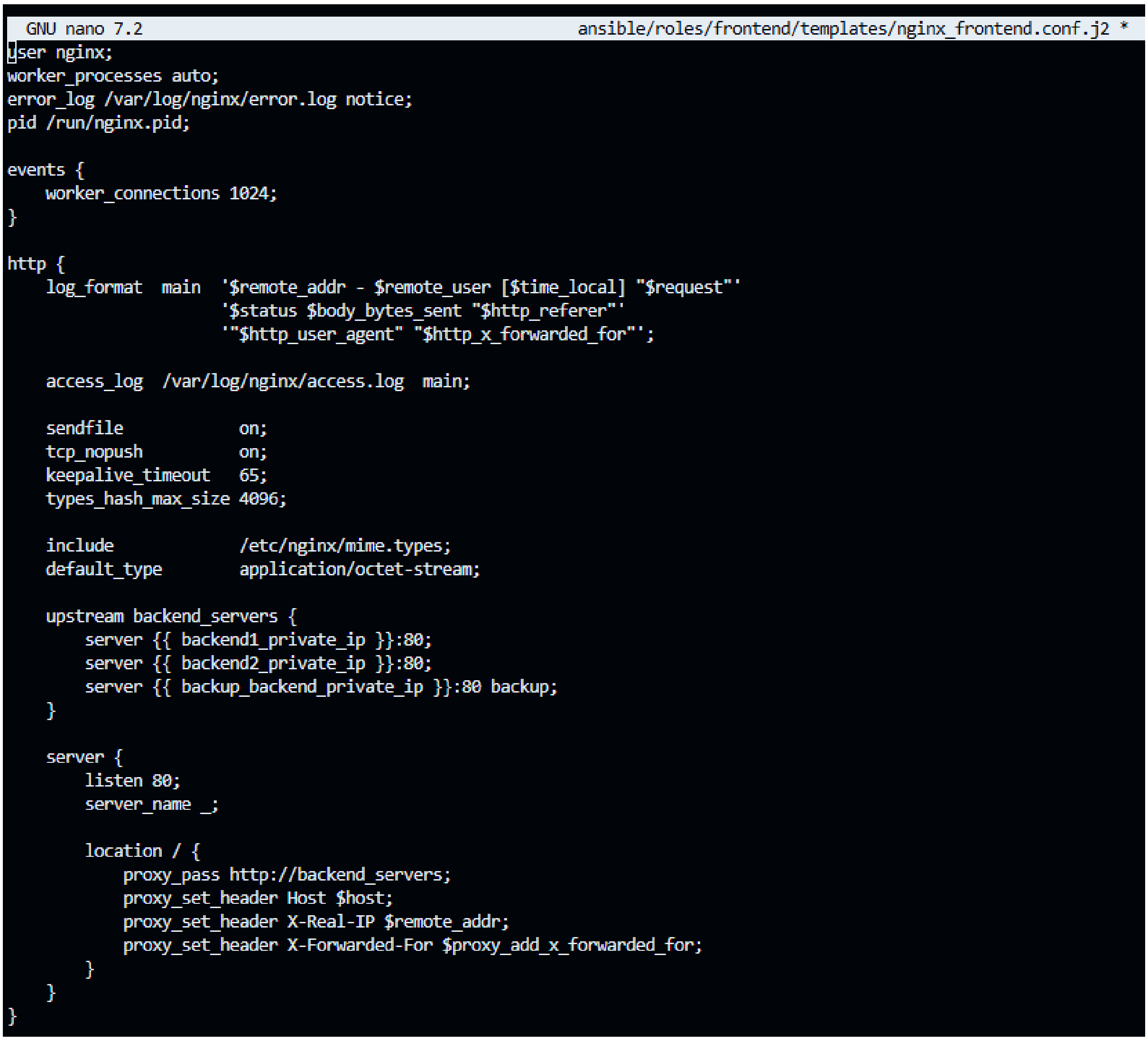
roles/frontend/handlers/main.yml



```
lers/main.yml
@SadafRiaz077 ➜/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ cat ansib
ers/main.yml
---
- name: Restart nginx
  service:
    name: nginx
    state: restarted
@SadafRiaz077 ➜/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ 
```

Frontend NGINX Template

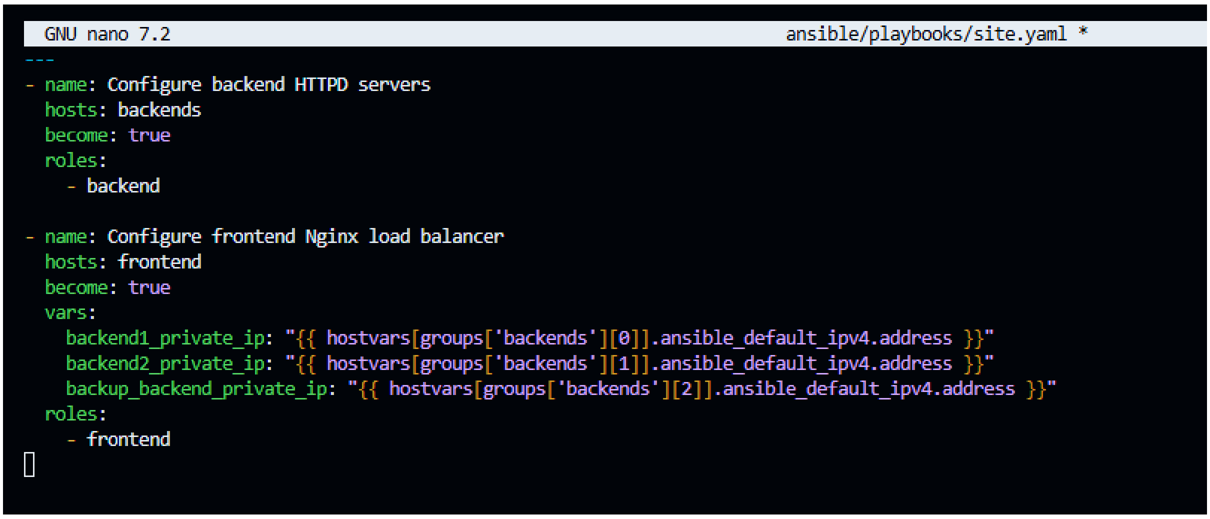
roles/frontend/templates/nginx_frontend.conf.j2



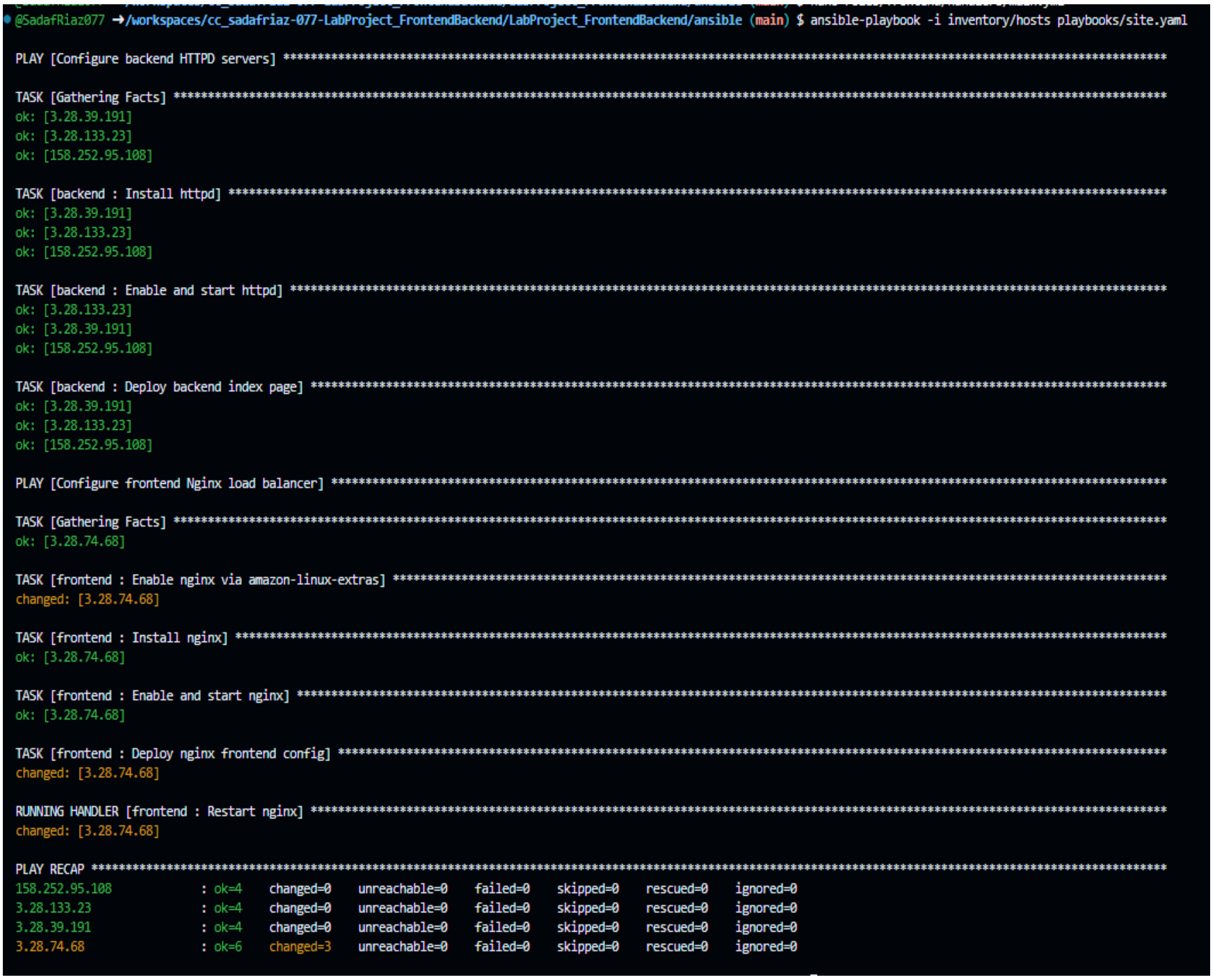
```
user nginx;
worker_processes auto;
error_log /var/log/nginx/error.log notice;
pid /run/nginx.pid;

events {
    worker_connections 1024;
}

http {
    log_format  main  '$remote_addr - $remote_user [$time_local] "$request"'
                      '$status $body_bytes_sent "$http_referer"'
                      '"$http_user_agent" "$http_x_forwarded_for"';

    access_log  /var/log/nginx/access.log  main;

    sendfile            on;
    tcp_nopush          on;
    keepalive_timeout   65;
    types_hash_max_size 4096;

    include             /etc/nginx/mime.types;
    default_type        application/octet-stream;

    upstream backend_servers {
        server {{ backend1_private_ip }}:80;
        server {{ backend2_private_ip }}:80;
        server {{ backup_backend_private_ip }}:80 backup;
    }

    server {
        listen 80;
        server_name _;

        location / {
            proxy_pass http://backend_servers;
            proxy_set_header Host $host;
            proxy_set_header X-Real-IP $remote_addr;
            proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
        }
    }
}
```

6. Main Ansible Playbook

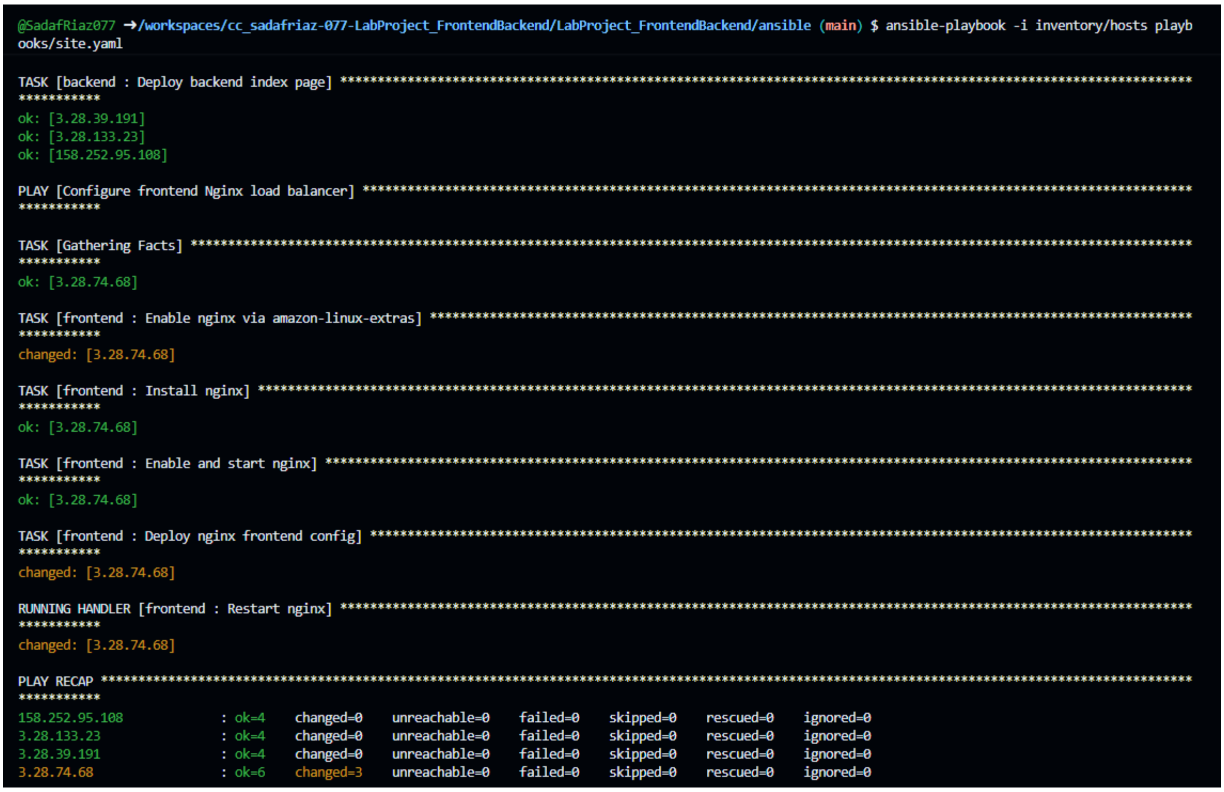
nano ansible/playbooks/site.yaml



```
  GNU nano 7.2                                                          ansible/playbooks/site.yaml *
---
- name: Configure backend HTTPD servers
  hosts: backends
  become: true
  roles:
    - backend

- name: Configure frontend Nginx load balancer
  hosts: frontend
  become: true
  vars:
    backend1_private_ip: "{{ hostvars[groups['backends'][0]].ansible_default_ipv4.address }}"
    backend2_private_ip: "{{ hostvars[groups['backends'][1]].ansible_default_ipv4.address }}"
    backup_backend_private_ip: "{{ hostvars[groups['backends'][2]].ansible_default_ipv4.address }}"
  roles:
    - frontend
```



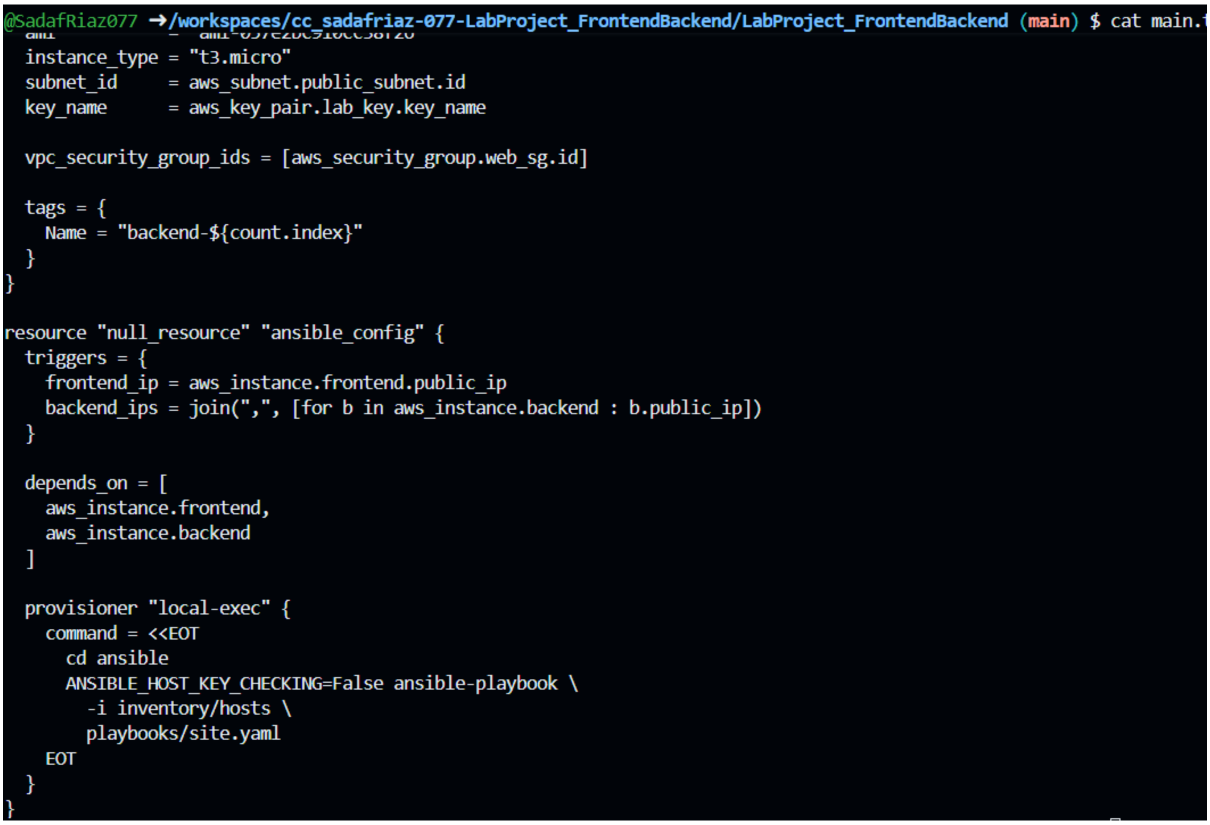
```
● @SadafRiaz077 →/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend/ansible (main) $ ansible-playbook -i inventory/hosts playbooks/site.yaml

PLAY [Configure backend HTTPD servers] ************************************************************************************

TASK [Gathering Facts] ****************************************************************************************************
ok: [3.28.39.191]
ok: [3.28.133.23]
ok: [158.252.95.108]

TASK [backend : Install httpd] ********************************************************************************************
ok: [3.28.39.191]
ok: [3.28.133.23]
ok: [158.252.95.108]

TASK [backend : Enable and start httpd] ***********************************************************************************
ok: [3.28.133.23]
ok: [3.28.39.191]
ok: [158.252.95.108]

TASK [backend : Deploy backend index page] ********************************************************************************
ok: [3.28.39.191]
ok: [3.28.133.23]
ok: [158.252.95.108]

PLAY [Configure frontend Nginx load balancer] *****************************************************************************

TASK [Gathering Facts] ****************************************************************************************************
ok: [3.28.74.68]

TASK [frontend : Enable nginx via amazon-linux-extras] ********************************************************************
changed: [3.28.74.68]

TASK [frontend : Install nginx] *******************************************************************************************
ok: [3.28.74.68]

TASK [frontend : Enable and start nginx] **********************************************************************************
ok: [3.28.74.68]

TASK [frontend : Deploy nginx frontend config] ****************************************************************************
changed: [3.28.74.68]

RUNNING HANDLER [frontend : Restart nginx] ********************************************************************************
changed: [3.28.74.68]

PLAY RECAP ****************************************************************************************************************
158.252.95.108             : ok=4    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
3.28.133.23                : ok=4    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
3.28.39.191                : ok=4    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
3.28.74.68                 : ok=6    changed=3    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```



```
@SadafRiaz077 ➜ /workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend/ansible (main) $ ansible-playbook -i inventory/hosts playb
ooks/site.yaml

TASK [backend : Deploy backend index page] *****************************************************************************************************
***********
ok: [3.28.39.191]
ok: [3.28.133.23]
ok: [158.252.95.108]

PLAY [Configure frontend Nginx load balancer] **************************************************************************************************
***********

TASK [Gathering Facts] *************************************************************************************************************************
***********
ok: [3.28.74.68]

TASK [frontend : Enable nginx via amazon-linux-extras] *****************************************************************************************
***********
changed: [3.28.74.68]

TASK [frontend : Install nginx] ****************************************************************************************************************
***********
ok: [3.28.74.68]

TASK [frontend : Enable and start nginx] *******************************************************************************************************
***********
ok: [3.28.74.68]

TASK [frontend : Deploy nginx frontend config] *************************************************************************************************
***********
changed: [3.28.74.68]

RUNNING HANDLER [frontend : Restart nginx] *****************************************************************************************************
***********
changed: [3.28.74.68]

PLAY RECAP *************************************************************************************************************************************
***********
158.252.95.108             : ok=4    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
3.28.133.23                : ok=4    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
3.28.39.191                : ok=4    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
3.28.74.68                 : ok=6    changed=3    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

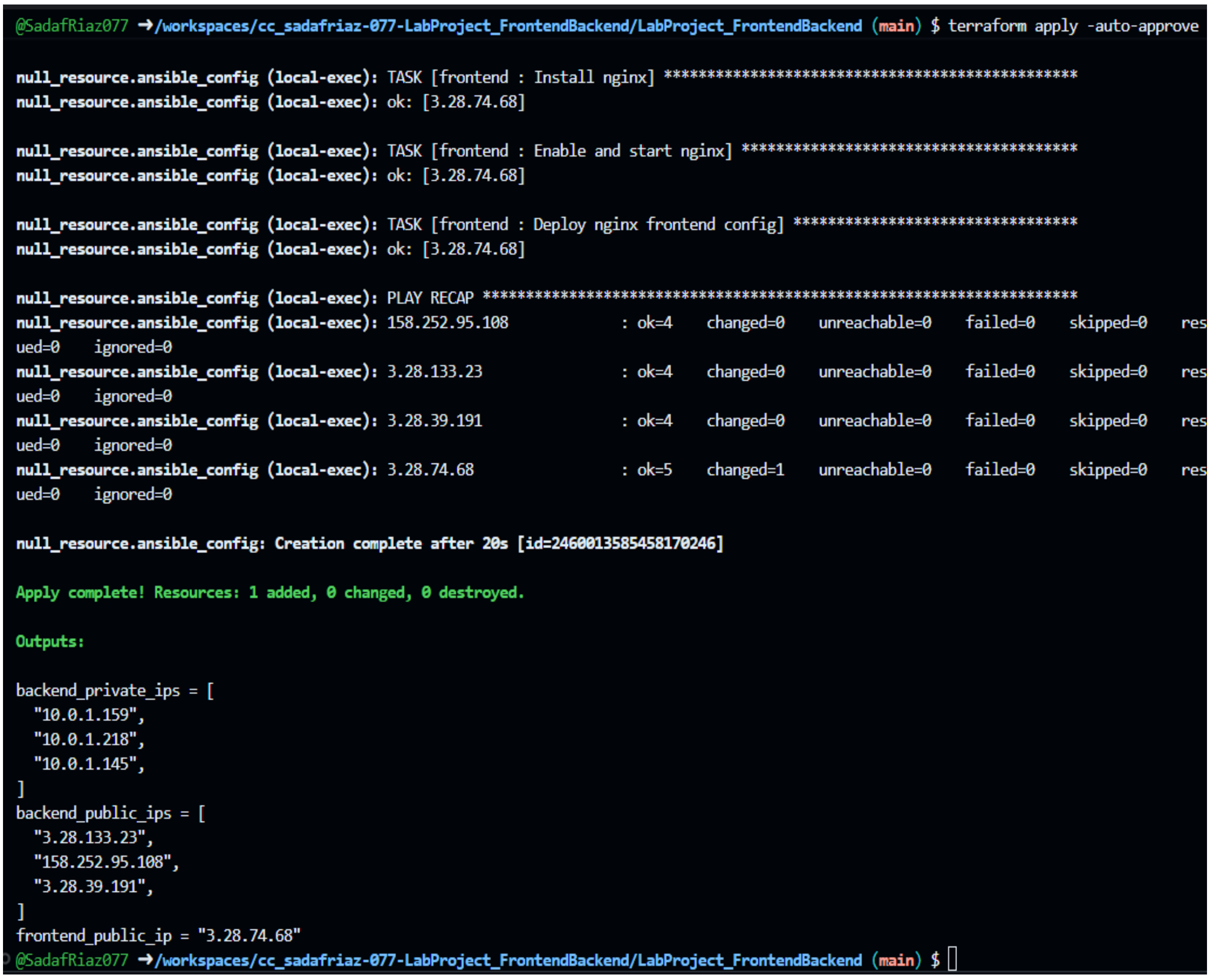
7. Terraform–Ansible Integration (Automation)

main.tf



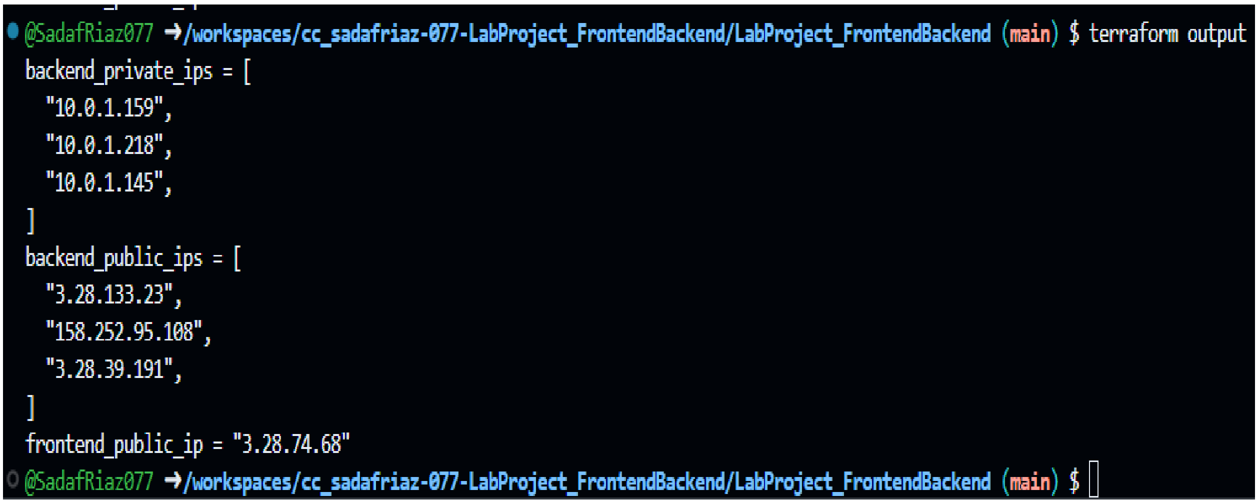
```
@SadafRiaz077 ➜ /workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ cat main.t
  instance_type = "t3.micro"
  subnet_id     = aws_subnet.public_subnet.id
  key_name      = aws_key_pair.lab_key.key_name

  vpc_security_group_ids = [aws_security_group.web_sg.id]

  tags = {
    Name = "backend-${count.index}"
  }
}

resource "null_resource" "ansible_config" {
  triggers = {
    frontend_ip = aws_instance.frontend.public_ip
    backend_ips = join(",", [for b in aws_instance.backend : b.public_ip])
  }

  depends_on = [
    aws_instance.frontend,
    aws_instance.backend
  ]

  provisioner "local-exec" {
    command = <<EOT
      cd ansible
      ANSIBLE_HOST_KEY_CHECKING=False ansible-playbook \
        -i inventory/hosts \
        playbooks/site.yaml
    EOT
  }
}
```

terraform apply -auto-approve



```
@SadafRiaz077 ➜/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ terraform apply -auto-approve

null_resource.ansible_config (local-exec): TASK [frontend : Install nginx] ***********************************************
null_resource.ansible_config (local-exec): ok: [3.28.74.68]

null_resource.ansible_config (local-exec): TASK [frontend : Enable and start nginx] **************************************
null_resource.ansible_config (local-exec): ok: [3.28.74.68]

null_resource.ansible_config (local-exec): TASK [frontend : Deploy nginx frontend config] ********************************
null_resource.ansible_config (local-exec): ok: [3.28.74.68]

null_resource.ansible_config (local-exec): PLAY RECAP ********************************************************************
null_resource.ansible_config (local-exec): 158.252.95.108             : ok=4    changed=0    unreachable=0    failed=0    skipped=0    res
ued=0    ignored=0
null_resource.ansible_config (local-exec): 3.28.133.23                : ok=4    changed=0    unreachable=0    failed=0    skipped=0    res
ued=0    ignored=0
null_resource.ansible_config (local-exec): 3.28.39.191                : ok=4    changed=0    unreachable=0    failed=0    skipped=0    res
ued=0    ignored=0
null_resource.ansible_config (local-exec): 3.28.74.68                 : ok=5    changed=1    unreachable=0    failed=0    skipped=0    res
ued=0    ignored=0

null_resource.ansible_config: Creation complete after 20s [id=2460013585458170246]

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

Outputs:

backend_private_ips = [
  "10.0.1.159",
  "10.0.1.218",
  "10.0.1.145",
]
backend_public_ips = [
  "3.28.133.23",
  "158.252.95.108",
  "3.28.39.191",
]
frontend_public_ip = "3.28.74.68"
@SadafRiaz077 ➜/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ 
```

terraform output



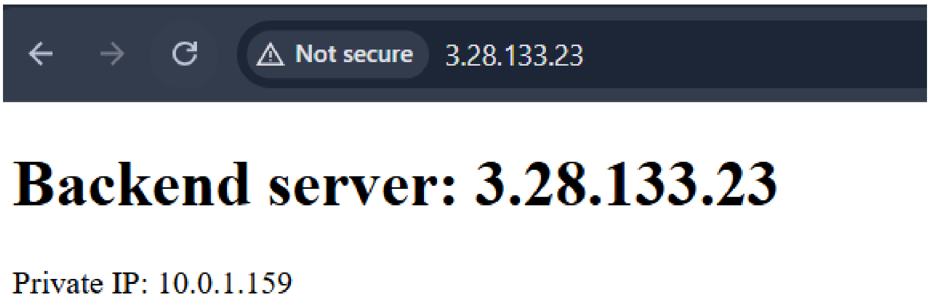
```
@SadafRiaz077 ➜/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ terraform output
backend_private_ips = [
  "10.0.1.159",
  "10.0.1.218",
  "10.0.1.145",
]
backend_public_ips = [
  "3.28.133.23",
  "158.252.95.108",
  "3.28.39.191",
]
frontend_public_ip = "3.28.74.68"
@SadafRiaz077 ➜/workspaces/cc_sadafriaz-077-LabProject_FrontendBackend/LabProject_FrontendBackend (main) $ 
```

Results

Testing on Browser

Backend

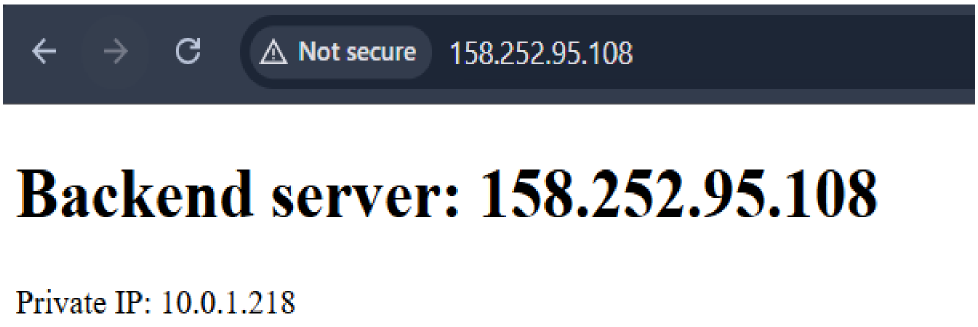
http://3.28.133.23/



Backend server: 3.28.133.23

Private IP: 10.0.1.159

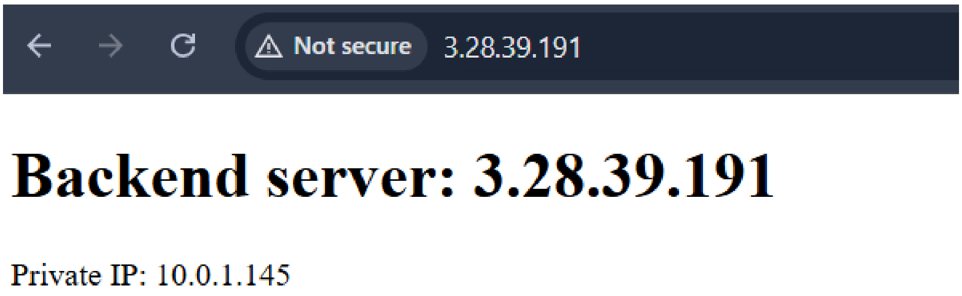
http://158.252.95.108/



Backend server: 158.252.95.108

Private IP: 10.0.1.218

http://3.28.39.191

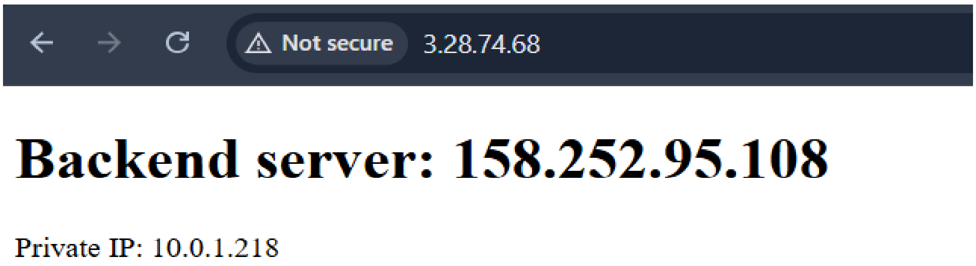


Backend server: 3.28.39.191

Private IP: 10.0.1.145

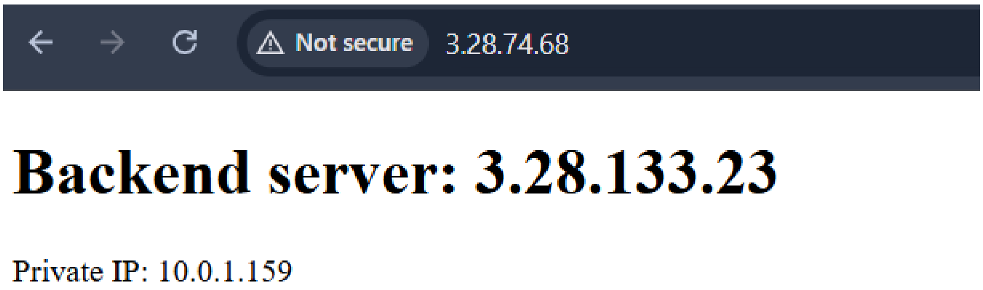
Frontend (http://3.28.74.68/)

Alternates between backend 1 and backend 2



Backend server: 158.252.95.108

Private IP: 10.0.1.218



Backend server: 3.28.133.23

Private IP: 10.0.1.159