Ansible

1. Install Ansible on CentOs 7, Ubuntu and Amazon Linux 2.
2. Creating my first Ansible Control Node using Terraform.
3. Creating my first's Ansible Managed Node using Terraform.
4. My first Ansible project (inventory file).
5. My second Ansible project.
6. My third Ansible project (ansible.cfg).
7. My fourth Ansible project.
8. My fifth Ansible project (vars, children).
9. My first Ansible playbook.
10. My second Ansible playbook.
11. My third **Ansible** playbook.
12. My fourth **Ansible** playbook.
13. My fifth **Ansible** playbook.
14. My sixth **Ansible** playbook. Loops.
15. My seventh **Ansible** playbook. Loops2.
16. My eight **Ansible** playbook. Templates and Jinja.
17. **Ansible** Roles.
18. **Ansible**. Troubleshooting.
19. **Ansible**. Vault.

1. Install Ansible on CentOs 7, Ubuntu and Amazon Linux 2.

- **Node requirement summary**

The table below lists the current and historical versions of **Python** required on control and managed nodes.

ansible-core Version	Control node Python	Managed node Python
2.11	Python 2.7, Python 3.5 - 3.9 [†]	Python 2.6 - 2.7, Python 3.5 - 3.9
2.12	Python 3.8 - 3.10	Python 2.6 - 2.7, Python 3.5 - 3.10
2.13	Python 3.8 - 3.10	Python 2.7, Python 3.5 - 3.10
2.14	Python 3.9 - 3.11	Python 2.7, Python 3.5 - 3.11

- **Ensuring pip is available**

To verify whether **pip** is already installed for your preferred Python:

```
$  python3 -m pip -V
```

```
vagrant@vm1:~$
vagrant@vm1:~$ python3 -m pip -V
pip 22.3.1 from /usr/local/lib/python3.10/site-packages/pip (python 3.10)
vagrant@vm1:~$
```

If you see an error like *No module named pip*, you'll need to install **pip** under your chosen **Python** interpreter before proceeding. This may mean installing an additional OS package (for example, **python3-pip**), or installing the latest **pip** directly from the Python Packaging Authority by running the following:

```
$  curl https://bootstrap.pypa.io/get-pip.py -o get-pip.py
$  python3 get-pip.py --user
```

- **Installing Ansible**

Use **pip** in your selected Python environment to install the Ansible package of your choice for the current user:

```
$  python3 -m pip install --user ansible
```

Alternately, you can install a specific version of ansible-core in this Python environment:

```
$  python3 -m pip install --user ansible-core==2.13.5
```

- **Upgrading Ansible**

To upgrade an existing Ansible installation in this Python environment to the latest released version, simply add **--upgrade** to the command above:

```
$  python3 -m pip install --upgrade --user ansible
```

- **Confirming your installation**

You can test that Ansible is installed correctly by checking the version:

```
$  ansible --version
```

To check the version of the ansible package that has been installed:

```
$  python3 -m pip show ansible
```

- **Installing Ansible on specific operating systems**

a. Install Installing Ansible on CentOs 7

```
$  sudo yum install epel-release
$  sudo yum install ansible
```

RPMs for currently supported versions of CentOS are also available from **EPEL**

b. Install Installing Ansible on Ubuntu

```
$ sudo apt update
$ sudo apt install software-properties-common
$ sudo add-apt-repository --yes --update ppa:ansible/ansible
$ sudo apt install ansible
```

- **Amazon Linux**

a. Install Ansible on Amazon Linux2 using the Amazon Extras Library

```
$ sudo yum update -y
$ sudo amazon-linux-extras install ansible2 -y
$ ansible --version
```

b. Install Ansible on Amazon Linux2 using EPEL

```
$ sudo amazon-linux-extras install epel -y
$ sudo yum repolist
$ sudo yum-config-manager --enable epel
$ sudo amazon-linux-extras disable ansible2
$ sudo yum --enablerepo epel install ansible
$ ansible --version
```

2. Creating my first Ansible Control Node using Terraform.

- **Terraform file**


user_data.sh
ansible_control_node.tf
ansible_control_node.tf > ...
91
92 resource "aws_key_pair" "ansible" {
93
94 key_name = "ansible_key"
95 public_key = "ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQCTvBHezQsUflrdfOHSc2el5RO7lxWnyCY/xAc5
96
97 }
98
99 data "aws_key_pair" "current" {
100
101 depends_on = [
102 aws_key_pair.ansible
103]
104
105 key_name = "ansible_key"
106
107 }
108
109 data "aws_instance" "current" {
110
111 depends_on = [
112 aws_instance.AnsibleController,
113 aws_eip.my_static_ip
114]
115
116 filter {
117 name = "tag:Name"
118 values = ["AnsibleController"]
119 }
120
121 }
122
123 output "name" {
124 value = data.aws_key_pair.current.key_name
125 }
126
127 output "data_aws_instance_current" {
128
129 value = data.aws_instance.current.public_ip
130
131 }
132
133 output "data_aws_instance_public_dns" {
134
135 value = data.aws_instance.current.public_dns
136
137 }

- **user_data.sh file**

user_data.sh | ansible_control_node.tf

```
$ user_data.sh
#!/bin/bash

#---User data for terraform file including Ansible instalation for Ubuntu 22.04---#

# Installing python3 via update and upgrade command
sudo apt update
sudo apt -y upgrade

# checking python version
python3 --version > /home/ubuntu/python3_version.txt

# Installing pip3
sudo apt install -y python3-pip

#checking pip version
python3 -m pip -V > /home/ubuntu/pip3_version.txt


# Installing Ansible on Ubuntu

# 1. Use pip in your selected Python environment to install the Ansible package
# of your choice for the current user:

sudo -u ubuntu python3 -m pip install --user ansible-core==2.14.1


# Add a folder /home/ubuntu/.local/bin to $PATH variable (system wide):
sudo cat << EOF >> /etc/bash.bashrc
if [ -d "/home/ubuntu/.local/bin" ] ; then
    PATH="/home/ubuntu/.local/bin:$(echo '$PATH')"
fi
EOF

# Add a folder /home/ubuntu/.local/bin to $PATH variable (for current user):
sudo cat << EOF >> /home/ubuntu/.bashrc
if [ -d "/home/ubuntu/.local/bin" ] ; then
  PATH="/home/ubuntu/.local/bin:$(echo '$PATH')"
fi
EOF

# test that Ansible is installed correctly by checking the version:
sudo exec bash
exec bash
sudo -u ubuntu ansible --version > /home/ubuntu/ansible_version.txt


#-----------------------------------------------------------------------------#
# 2. Alternative way to install Ansible:
# To configure the PPA on your system and install Ansible run these commands:
# sudo apt update
# sudo apt install -y software-properties-common
# sudo add-apt-repository --yes --update ppa:ansible/ansible
# sudo apt install -y ansible
#-----------------------------------------------------------------------------#
```

```
    Directory: C:\Users\Yevhen Yakymov\Desktop\Programing\DevOps\Terraform\infrastructure\Ans
    ibleControlNode


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----         06.01.2023     17:56           2874 ansible_control_node.tf
-a----         06.01.2023     20:21           1756 user_data.sh
```

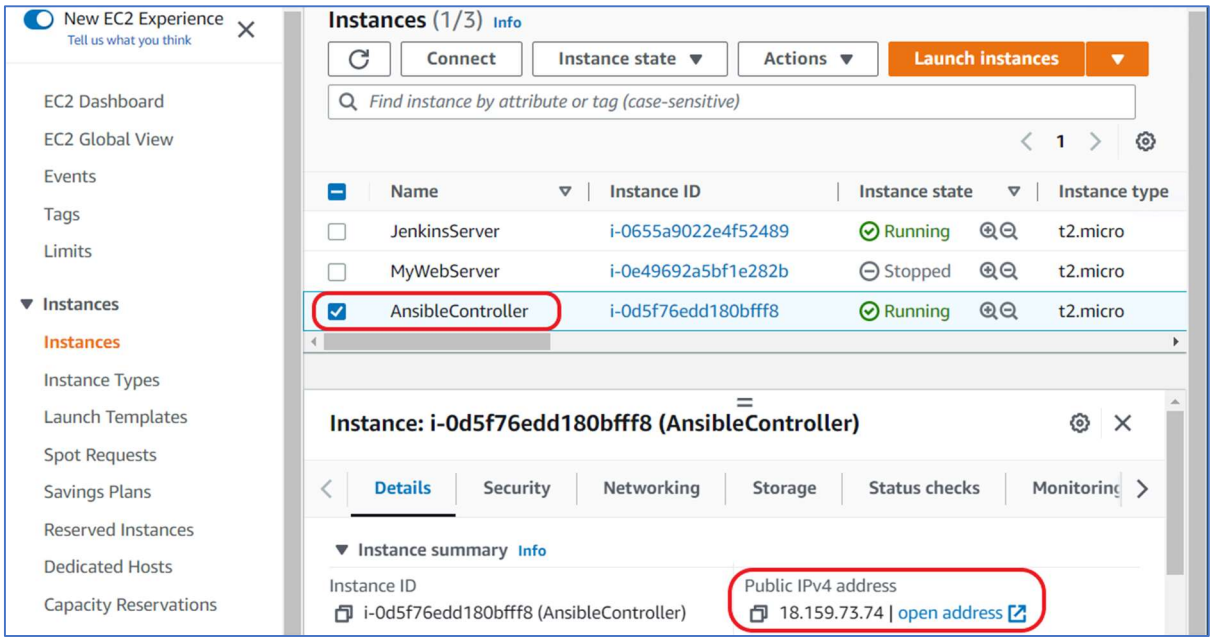
- **terraform plan, deploy and checking ansible version on AnsibleControlNode**

```
PS C:\Users\Yevhen Yakymov\Desktop\Programing\DevOps\Terraform\infrastructure\AnsibleControlNo
de> terraform plan
data.aws_ami.ubuntu_22_04: Reading...
data.aws_ami.ubuntu_22_04: Read complete after 0s [id=ami-095a2ffdd817c7a67]

Terraform used the selected providers to generate the following execution plan. Resource
actions are indicated with the following symbols:
  + create
 <= read (data resources)

Terraform will perform the following actions:

  # data.aws_instance.current will be read during apply
  # (depends on a resource or a module with changes pending)
 <= data "aws_instance" "current" {
      + ami                         = (known after apply)
      + arn                         = (known after apply)
```

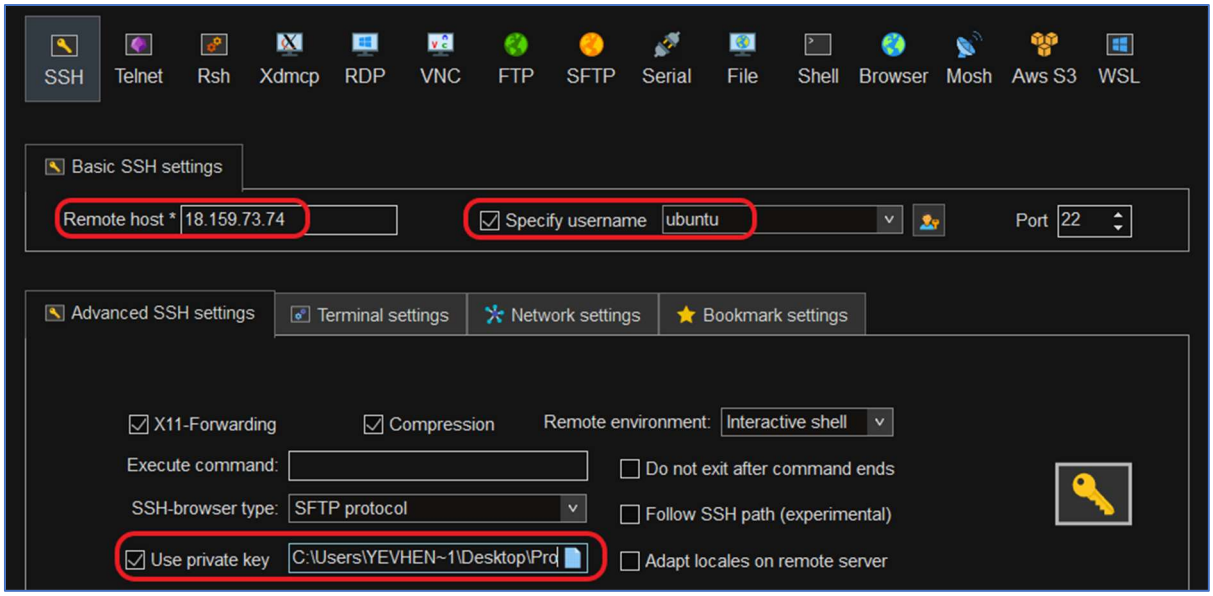
```
Plan: 4 to add, 0 to change, 0 to destroy.

Changes to Outputs:
  + data_aws_instance_current    = (known after apply)
  + data_aws_instance_public_dns = (known after apply)
  + name                         = "ansible_key"
```

```
de> terraform apply
data.aws_ami.ubuntu_22_04: Reading...
data.aws_ami.ubuntu_22_04: Read complete after 0s [id=ami-095a2ffdd817c7a67]

Terraform used the selected providers to generate the following execution plan. Resource
actions are indicated with the following symbols:
  + create
 <= read (data resources)

Terraform will perform the following actions:

  # data.aws_instance.current will be read during apply
  # (depends on a resource or a module with changes pending)
 <= data "aws_instance" "current" {
      + ami                         = (known after apply)
      + arn                         = (known after apply)
```

```
  Enter a value: yes

aws_key_pair.ansible: Creating...
aws_security_group.AnsibleController: Creating...
aws_key_pair.ansible: Creation complete after 1s [id=ansible_key]
data.aws_key_pair.current: Reading...
data.aws_key_pair.current: Read complete after 0s [id=key-0e52c55459832c387]
aws_security_group.AnsibleController: Creation complete after 3s [id=sg-00ba31e3a7ee21fb2]
aws_instance.AnsibleController: Creating...
aws_instance.AnsibleController: Still creating... [10s elapsed]
aws_instance.AnsibleController: Still creating... [20s elapsed]
aws_instance.AnsibleController: Still creating... [30s elapsed]
aws_instance.AnsibleController: Still creating... [40s elapsed]
aws_instance.AnsibleController: Creation complete after 43s [id=i-0d5f76edd180bfff8]
aws_eip.my_static_ip: Creating...
aws_eip.my_static_ip: Creation complete after 1s [id=eipalloc-0e49fb284e69bd25c]
data.aws_instance.current: Reading...
data.aws_instance.current: Read complete after 2s [id=i-0d5f76edd180bfff8]

Apply complete! Resources: 4 added, 0 changed, 0 destroyed.

Outputs:

data_aws_instance_current = "18.159.73.74"
data_aws_instance_public_dns = "ec2-18-159-73-74.eu-central-1.compute.amazonaws.com"
name = "ansible_key"
```



ssh to our AnsibleController with MobaXterm using public IP and ansible_key



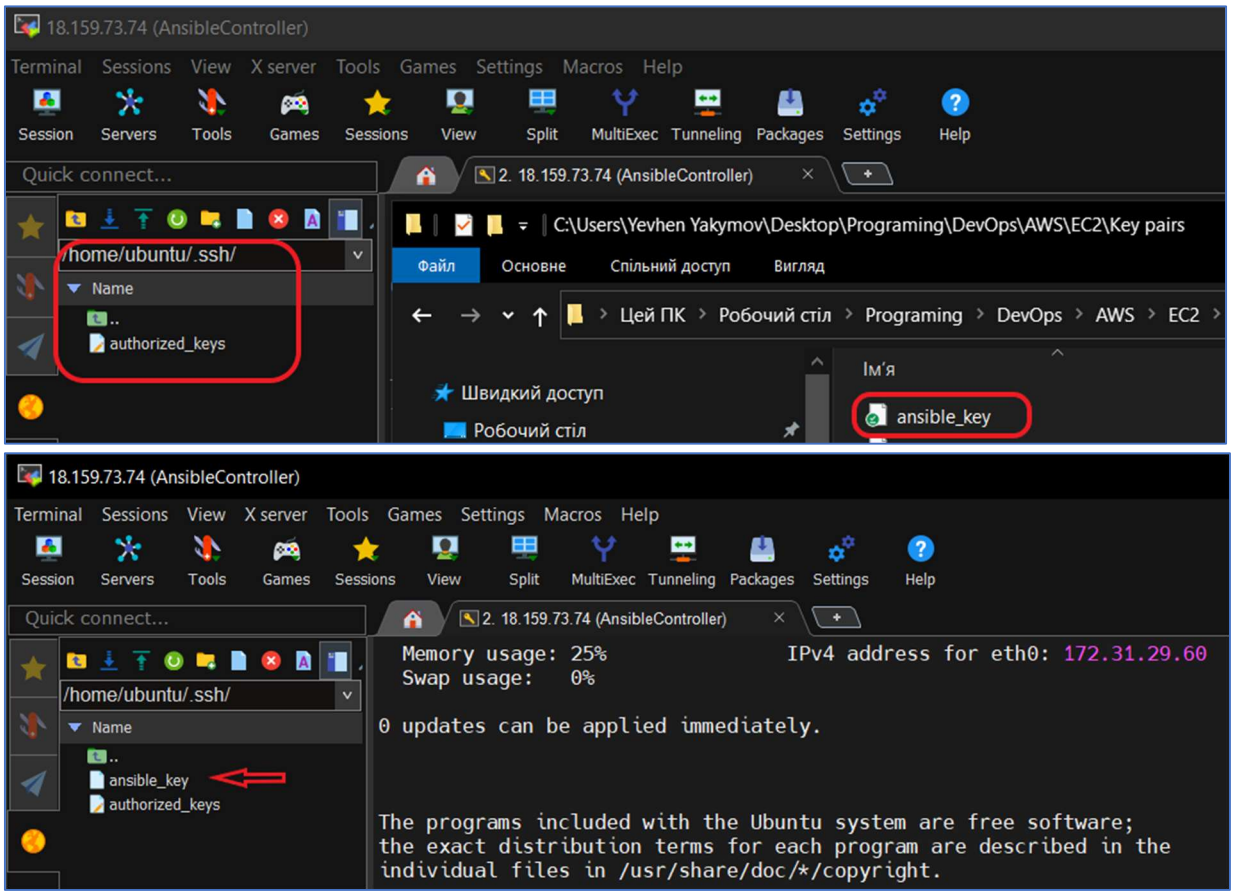
Checking **Ansible** version

```
ubuntu@ip-172-31-29-60:~$ ansible --version
ansible [core 2.14.1]
  config file = None
  configured module search path = ['/home/ubuntu/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /home/ubuntu/.local/lib/python3.10/site-packages/ansible
  ansible collection location = /home/ubuntu/.ansible/collections:/usr/share/ansible/collections
  executable location = /home/ubuntu/.local/bin/ansible
  python version = 3.10.6 (main, Nov 14 2022, 16:10:14) [GCC 11.3.0] (/usr/bin/python3)
  jinja version = 3.0.3
  libyaml = True
ubuntu@ip-172-31-29-60:~$ ll
total 48
drwxr-x--- 6 ubuntu ubuntu 4096 Jan  7 17:37 ./
drwxr-xr-x 3 root   root   4096 Jan  7 17:26 ../
-rw------- 1 ubuntu ubuntu   61 Jan  7 17:37 .Xauthority
drwxrwxr-x 3 ubuntu ubuntu 4096 Jan  7 17:37 .ansible/
-rw-r--r-- 1 ubuntu ubuntu  220 Jan  6  2022 .bash_logout
-rw-r--r-- 1 ubuntu ubuntu 3856 Jan  7 17:27 .bashrc
drwxrwxr-x 3 ubuntu ubuntu 4096 Jan  7 17:37 .cache/
drwxrwxr-x 4 ubuntu ubuntu 4096 Jan  7 17:27 .local/
-rw-r--r-- 1 ubuntu ubuntu  807 Jan  6  2022 .profile
drwx------ 2 ubuntu ubuntu 4096 Jan  7 17:26 .ssh/
-rw-r--r-- 1 root   root     65 Jan  7 17:27 pip3_version.txt
-rw-r--r-- 1 root   root     14 Jan  7 17:26 python3_version.txt
```

Checking **Python3 and pip** version

```
ubuntu@ip-172-31-29-60:~$ ll
total 48
drwxr-x--- 6 ubuntu ubuntu 4096 Jan  7 17:37 ./
drwxr-xr-x 3 root   root   4096 Jan  7 17:26 ../
-rw------- 1 ubuntu ubuntu   61 Jan  7 17:37 .Xauthority
drwxrwxr-x 3 ubuntu ubuntu 4096 Jan  7 17:37 .ansible/
-rw-r--r-- 1 ubuntu ubuntu  220 Jan  6  2022 .bash_logout
-rw-r--r-- 1 ubuntu ubuntu 3856 Jan  7 17:27 .bashrc
drwxrwxr-x 3 ubuntu ubuntu 4096 Jan  7 17:37 .cache/
drwxrwxr-x 4 ubuntu ubuntu 4096 Jan  7 17:27 .local/
-rw-r--r-- 1 ubuntu ubuntu  807 Jan  6  2022 .profile
drwx------ 2 ubuntu ubuntu 4096 Jan  7 17:57 .ssh/
-rw-r--r-- 1 root   root     65 Jan  7 17:27 pip3_version.txt
-rw-r--r-- 1 root   root     14 Jan  7 17:26 python3_version.txt
ubuntu@ip-172-31-29-60:~$
ubuntu@ip-172-31-29-60:~$ cat python3_version.txt
Python 3.10.6
ubuntu@ip-172-31-29-60:~$ cat pip3_version.txt
pip 22.0.2 from /usr/lib/python3/dist-packages/pip (python 3.10)
ubuntu@ip-172-31-29-60:~$
```

- **copy ansible_key to the AnsibleController**



3. Creating my first's Ansible Managed Node using Terraform.

- **Terraform file**

ansible_managed_node.tf | user_data.sh

ansible_managed_node.tf > data "aws_ami" "ubuntu_22_04" > most_recent

```
terraform {
  required_providers {
    aws = {
      source = "hashicorp/aws"
      version = "4.44.0"
    }
  }
}

provider "aws" {
  access_key = "AK[redacted]"
  secret_key = "vH[redacted]"
  region = "eu-central-1"
}


data "aws_ami" "ubuntu_22_04" {

  most_recent = true
  owners = ["099720109477"]

  filter {
    name = "name"
    values = ["ubuntu/images/hvm-ssd/ubuntu-jammy-22.04-amd64-server-*"]
  }

}


resource "aws_instance" "AnsibleManagedNode" {

  count = var.instance_count
  ami = data.aws_ami.ubuntu_22_04.id
  instance_type = "t2.micro"
  vpc_security_group_ids = [aws_security_group.AnsibleManagedNode.id]
  key_name = data.aws_key_pair.current.key_name
  tags = {
    Name = "AnsibleManagedNode-${count.index + 1}"
    Project = "AnsibleManagedNode"
    Owner = "yakymov1yevhen@gmail.com"
  }
  depends_on = [
    aws_key_pair.ansible
  ]
  user_data = file("user_data.sh")

}

variable "instance_count" {
  default = "3"
}

```

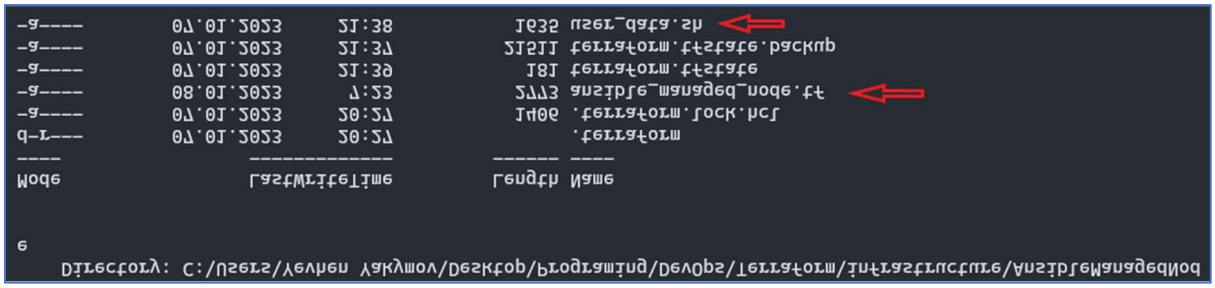

ansible_managed_node.tf
user_data.sh
ansible_managed_node.tf > data "aws_ami" "ubuntu_22_04" > most_recent
*/
resource "aws_security_group" "AnsibleManagedNode" {
name = "Ansible Managed Security Group"
description = "Allow SSH inbound traffic"
ingress {
description = "SSH from VPC"
from_port = 22
to_port = 22
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"]
}
tags = {
Name = "allow_ssh"
}
}
resource "aws_key_pair" "ansible" {
key_name = "ansible_managed_key"
public_key = "ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQCTvBHezQsUflrdfOHSc2el5RO7lxWnyCY/x
}
data "aws_key_pair" "current" {
depends_on = [
aws_key_pair.ansible
]
key_name = "ansible_managed_key"
}

- **user_data.sh file**

user_data.sh ansible_control_node.tf

$ user_data.sh

```
#!/bin/bash

#---User data for terraform file including Ansible instalation for Ubuntu 22.04---#

# Installing python3 via update and upgrade command
sudo apt update
sudo apt -y upgrade

# checking python version
python3 --version > /home/ubuntu/python3_version.txt

# Installing pip3
sudo apt install -y python3-pip

#checking pip version
python3 -m pip -V > /home/ubuntu/pip3_version.txt


# Installing Ansible on Ubuntu

# 1. Use pip in your selected Python environment to install the Ansible package
# of your choice for the current user:

sudo -u ubuntu python3 -m pip install --user ansible-core==2.14.1


# Add a folder /home/ubuntu/.local/bin to $PATH variable (system wide):
sudo cat << EOF >> /etc/bash.bashrc
if [ -d "/home/ubuntu/.local/bin" ] ; then
    PATH="/home/ubuntu/.local/bin:$(echo '$PATH')"
fi
EOF

# Add a folder /home/ubuntu/.local/bin to $PATH variable (for current user):
sudo cat << EOF >> /home/ubuntu/.bashrc
if [ -d "/home/ubuntu/.local/bin" ] ; then
  PATH="/home/ubuntu/.local/bin:$(echo '$PATH')"
fi
EOF

# test that Ansible is installed correctly by checking the version:
sudo exec bash
exec bash
sudo -u ubuntu ansible --version > /home/ubuntu/ansible_version.txt


#--------------------------------------------------------------------------------#
# 2. Alternative way to install Ansible:
# To configure the PPA on your system and install Ansible run these commands:
# sudo apt update
# sudo apt install -y software-properties-common
# sudo add-apt-repository --yes --update ppa:ansible/ansible
# sudo apt install -y ansible
#--------------------------------------------------------------------------------#
```



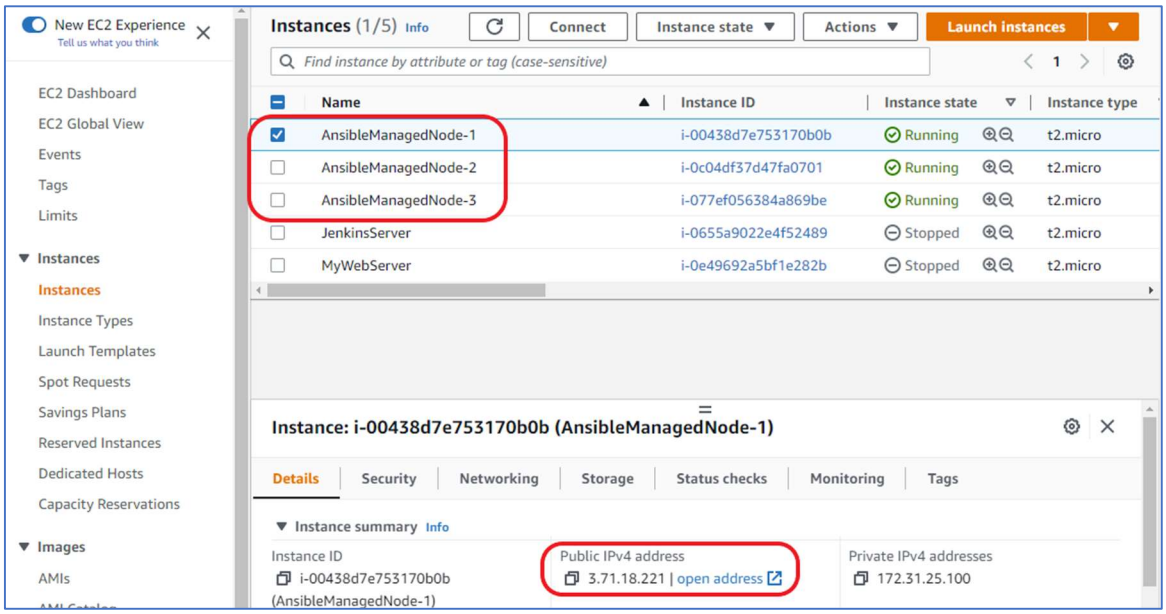
- **terraform plan, deploy and checking ansible version on AnsibleManagedNode**

```
PS C:\Users\Yevhen Yakymov\Desktop\Programing\DevOps\Terraform\infrastructure\AnsibleControlNo
de> terraform plan
data.aws_ami.ubuntu_22_04: Reading...
data.aws_ami.ubuntu_22_04: Read complete after 0s [id=ami-095a2ffdd817c7a67]

Terraform used the selected providers to generate the following execution plan. Resource
actions are indicated with the following symbols:
  + create
 <= read (data resources)

Terraform will perform the following actions:

  # data.aws_instance.current will be read during apply
  # (depends on a resource or a module with changes pending)
 <= data "aws_instance" "current" {
      + ami                         = (known after apply)
      + arn                         = (known after apply)
```

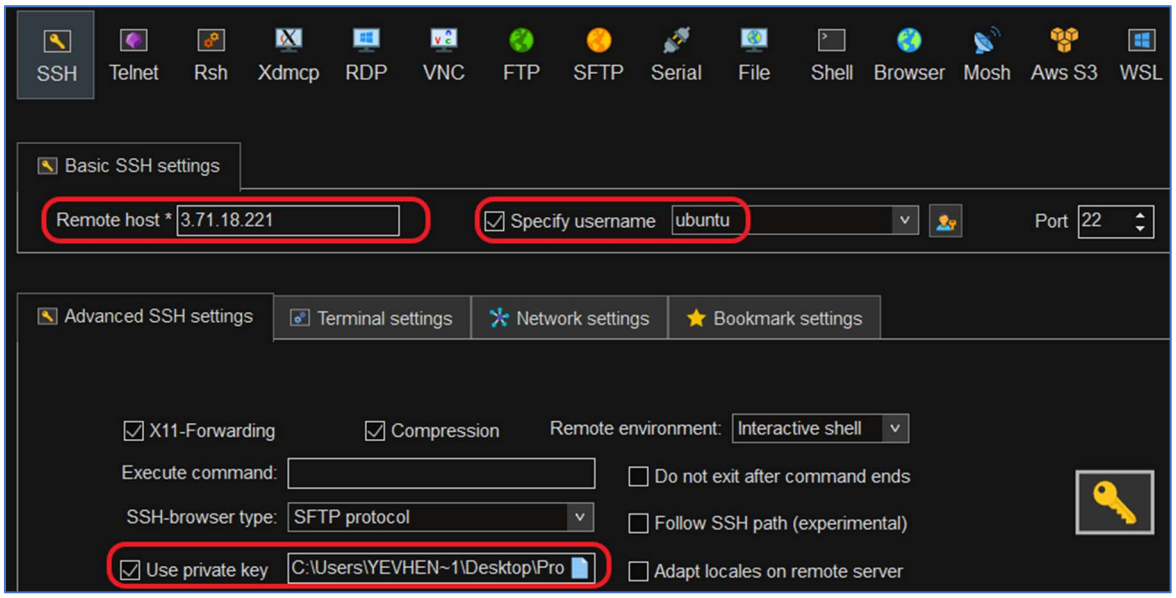
```
Plan: 5 to add, 0 to change, 0 to destroy.
```

```
de> terraform apply
data.aws_ami.ubuntu_22_04: Reading...
data.aws_ami.ubuntu_22_04: Read complete after 0s [id=ami-095a2ffdd817c7a67]

Terraform used the selected providers to generate the following execution plan. Resource
actions are indicated with the following symbols:
  + create
 <= read (data resources)

Terraform will perform the following actions:

  # data.aws_instance.current will be read during apply
  # (depends on a resource or a module with changes pending)
 <= data "aws_instance" "current" {
      + ami                         = (known after apply)
      + arn                         = (known after apply)
```

```
Do you want to perform these actions?
  Terraform will perform the actions described above.
  Only 'yes' will be accepted to approve.

  Enter a value: yes

aws_key_pair.ansible: Creating...
aws_security_group.AnsibleManagedNode: Creating...
aws_key_pair.ansible: Creation complete after 1s [id=ansible_managed_key]
data.aws_key_pair.current: Reading...
data.aws_key_pair.current: Read complete after 0s [id=key-063777b4d57d7f906]
aws_security_group.AnsibleManagedNode: Creation complete after 3s [id=sg-09a5dd502e329ea6b]
aws_instance.AnsibleManagedNode[1]: Creating...
aws_instance.AnsibleManagedNode[0]: Creating...
aws_instance.AnsibleManagedNode[2]: Creating...
aws_instance.AnsibleManagedNode[1]: Still creating... [10s elapsed]
aws_instance.AnsibleManagedNode[2]: Still creating... [10s elapsed]
aws_instance.AnsibleManagedNode[0]: Still creating... [10s elapsed]
aws_instance.AnsibleManagedNode[1]: Still creating... [20s elapsed]
aws_instance.AnsibleManagedNode[0]: Still creating... [20s elapsed]
aws_instance.AnsibleManagedNode[2]: Still creating... [20s elapsed]
aws_instance.AnsibleManagedNode[1]: Still creating... [30s elapsed]
aws_instance.AnsibleManagedNode[2]: Still creating... [30s elapsed]
aws_instance.AnsibleManagedNode[0]: Still creating... [30s elapsed]
aws_instance.AnsibleManagedNode[0]: Creation complete after 33s [id=i-00438d7e753170b0b]
aws_instance.AnsibleManagedNode[2]: Creation complete after 33s [id=i-077ef056384a869be]
aws_instance.AnsibleManagedNode[1]: Creation complete after 33s [id=i-0c04df37d47fa0701]

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



ssh to our AnsibleManagedNode-1 with MobaXterm using public IP and ansible_key



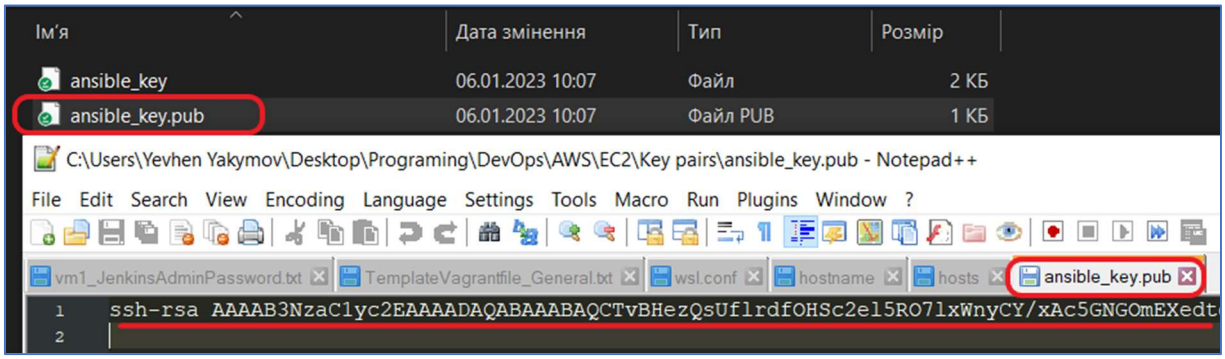
Checking **Ansible** version

```
ubuntu@ip-172-31-25-100:~$ ansible --version
ansible [core 2.14.1]
  config file = None
  configured module search path = ['/home/ubuntu/.ansible/plugins/modules', '/usr/share/ansible/p
s']
  ansible python module location = /home/ubuntu/.local/lib/python3.10/site-packages/ansible
  ansible collection location = /home/ubuntu/.ansible/collections:/usr/share/ansible/collections
  executable location = /home/ubuntu/.local/bin/ansible
  python version = 3.10.6 (main, Nov 14 2022, 16:10:14) [GCC 11.3.0] (/usr/bin/python3)
  jinja version = 3.0.3
  libyaml = True
ubuntu@ip-172-31-25-100:~$ ll
total 48
drwxr-x--- 6 ubuntu ubuntu 4096 Jan  8 05:41 ./
drwxr-xr-x 3 root   root   4096 Jan  8 05:35 ../
-rw------- 1 ubuntu ubuntu   62 Jan  8 05:41 .Xauthority
drwxrwxr-x 3 ubuntu ubuntu 4096 Jan  8 05:41 .ansible/
-rw-r--r-- 1 ubuntu ubuntu  220 Jan  6  2022 .bash_logout
-rw-r--r-- 1 ubuntu ubuntu 3856 Jan  8 05:36 .bashrc
drwxrwxr-x 3 ubuntu ubuntu 4096 Jan  8 05:41 .cache/
drwxrwxr-x 4 ubuntu ubuntu 4096 Jan  8 05:36 .local/
-rw-r--r-- 1 ubuntu ubuntu  807 Jan  6  2022 .profile
drwx------ 2 ubuntu ubuntu 4096 Jan  8 05:35 .ssh/
```

Checking **Python3 and pip** version

```
drwx------ 2 ubuntu ubuntu 4096 Jan  8 05:35 .ssh/
-rw-r--r-- 1 root   root     65 Jan  8 05:36 pip3_version.txt
-rw-r--r-- 1 root   root     14 Jan  8 05:36 python3_version.txt
ubuntu@ip-172-31-25-100:~$
ubuntu@ip-172-31-25-100:~$ cat python3_version.txt
Python 3.10.6
ubuntu@ip-172-31-25-100:~$ cat pip3_version.txt
pip 22.0.2 from /usr/lib/python3/dist-packages/pip (python 3.10)
```

- **copy ansible_key.pub to the AnsibleManagedNode-1(2,3) ~/.ssh/authorized_keys to have ability connect from AnsibleController to the AnsibleManagedNode-1(2,3)**




```
ubuntu@ip-172-31-25-100:~$ ll .ssh/
total 12
drwx------ 2 ubuntu ubuntu 4096 Jan  8 05:35 ./
drwxr-x--- 6 ubuntu ubuntu 4096 Jan  8 05:41 ../
-rw------- 1 ubuntu ubuntu  401 Jan  8 05:35 authorized_keys
ubuntu@ip-172-31-25-100:~$ cat .ssh/authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQCTvBHezQsUflrdfOHSc2el5RO7lxWnyCY/xAc5GNGOmEXedtglx4SRPCyl
FIQwOHz0TLGZ3kwhDFWHFL50gz7PGTyJpqMdMPvHkDrsiIw+uEp13HNiLYWAMqQIzrsiWodM/bD8imcvDlq+TnbBKv+J0i2r
I9VgHh2ppJs0BiIQUhMwY5rHWm03rD7/M5qqdoErpR6oF42n5CuVRzhfSPd60TuLQxNxpK24fuZbs/gkeotqrpUqpIAU+D6
DmXjgZBxv0Aj+e+Yy7+mHzY6fu2VGu08s+3aYGJxgThnav+3sp ansible_managed_key
ubuntu@ip-172-31-25-100:~$
```

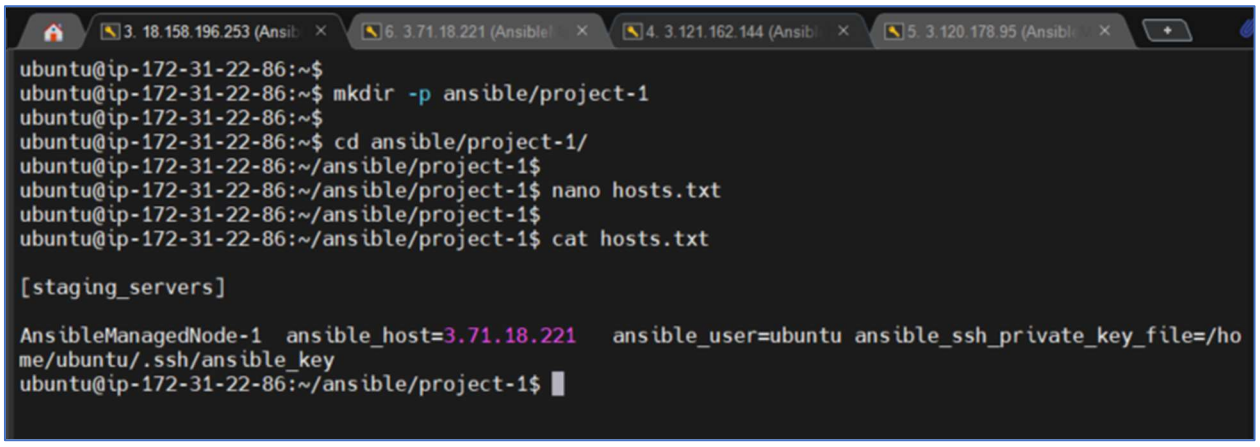
- **checking ssh connection from AnsibleController to the AnsibleManagedNode-1**

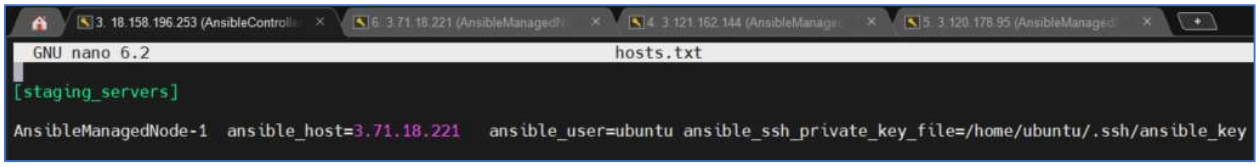
```
ubuntu@ip-172-31-22-86:~/.ssh$ ssh -i "ansible_key" ubuntu@ec2-3-71-18-221.eu-ce
ntral-1.compute.amazonaws.com
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-1026-aws x86_64)

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

  System information as of Sun Jan  8 06:03:39 UTC 2023

  System load:  0.0               Processes:             101
  Usage of /:   25.4% of 7.57GB   Users logged in:       1
  Memory usage: 28%               IPv4 address for eth0: 172.31.25.100
  Swap usage:   0%
```

```
ubuntu@ip-172-31-25-100:/etc$
ubuntu@ip-172-31-25-100:/etc$ curl http://169.254.169.254/latest/meta-data/public-ipv4
3.71.18.221ubuntu@ip-172-31-25-100:/etc$
ubuntu@ip-172-31-25-100:/etc$
```

4. My first **Ansible** project **(inventory file)**.

- Creation directory and file **hosts.txt(inventory file)** with description our managed node

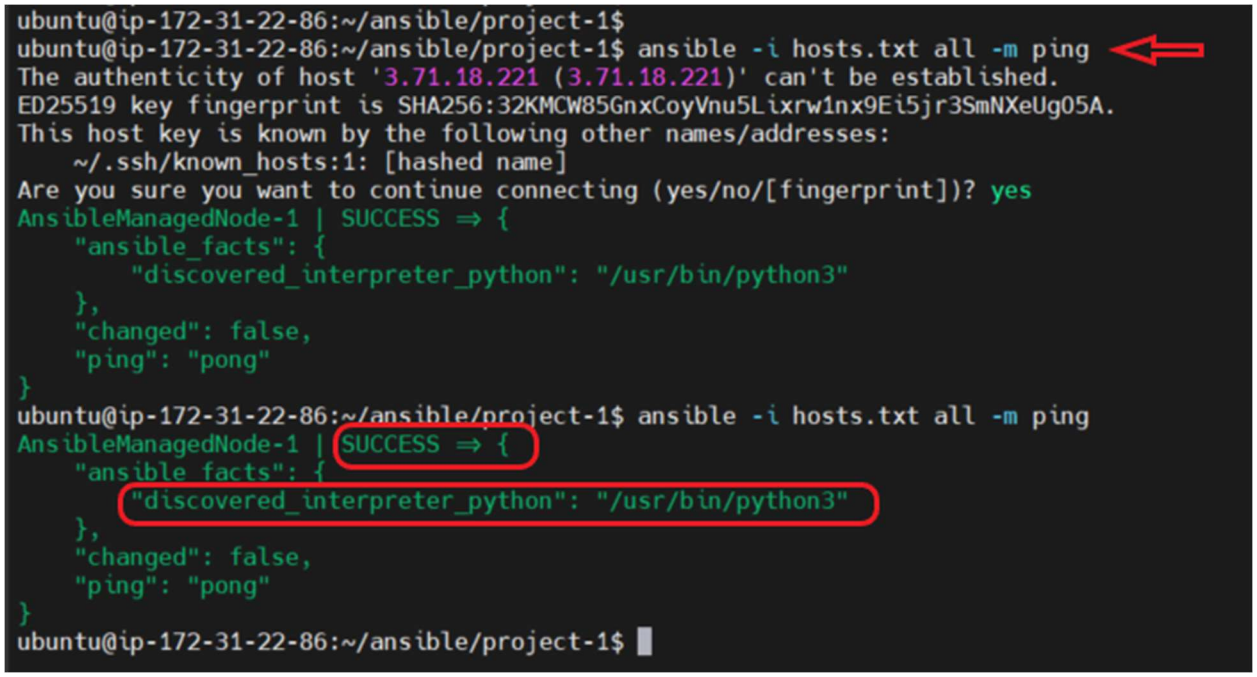




- Run first **ansible** command

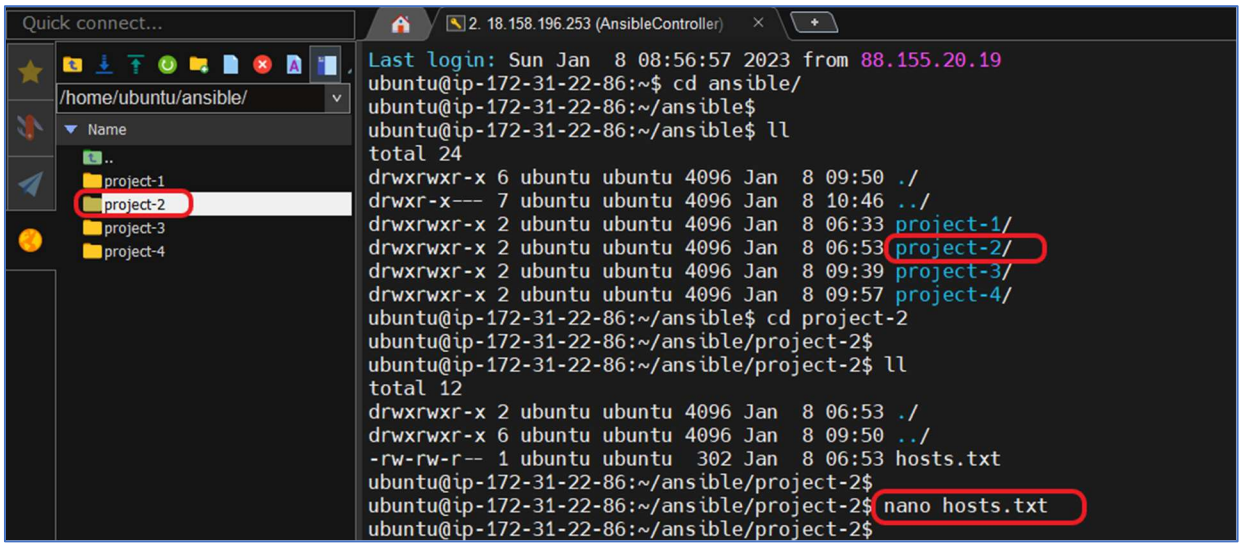
```
$ ansible -i hosts.txt all -m ping
```

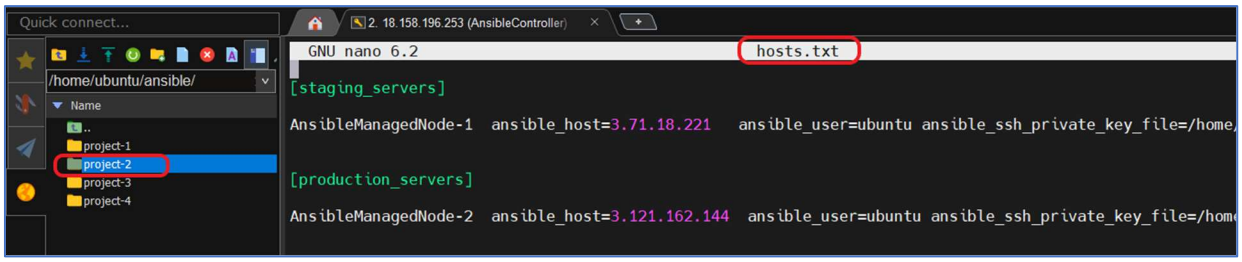
Where :
- i – option specify inventory host path or comma separated host list
hosts.txt – inventory file
all - apply for all servers described in the inventory file
-m – name of the action to execute
ping – module name



5. My second **Ansible** project.

- Creation project directory, file **hosts.txt(inventory)** with description our managed node's

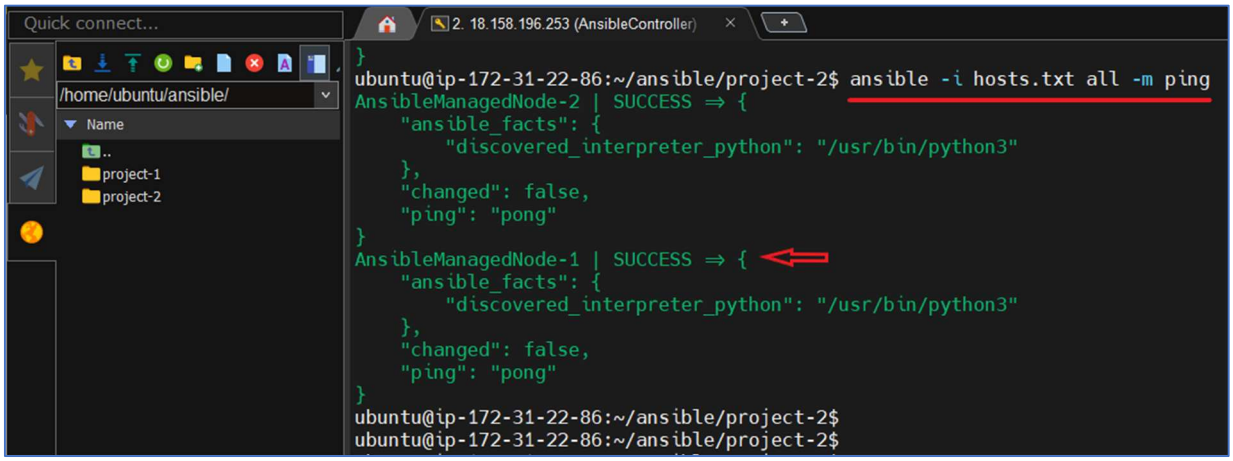




- Run **ansible** command

```
$ ansible -i hosts.txt all -m ping
```

Where :
- i – option specify inventory host path or comma separated host list
hosts.txt – inventory file
all - apply for all servers described in the inventory file
-m – name of the action(module) to execute
ping – module name

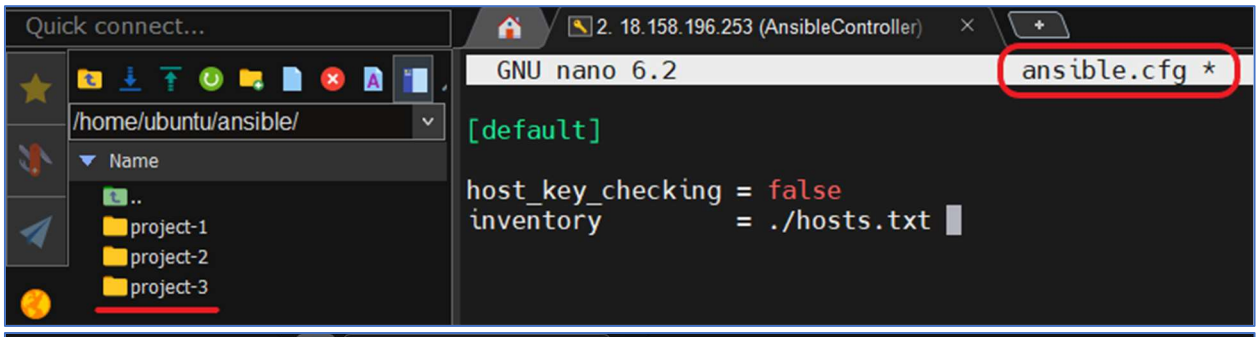


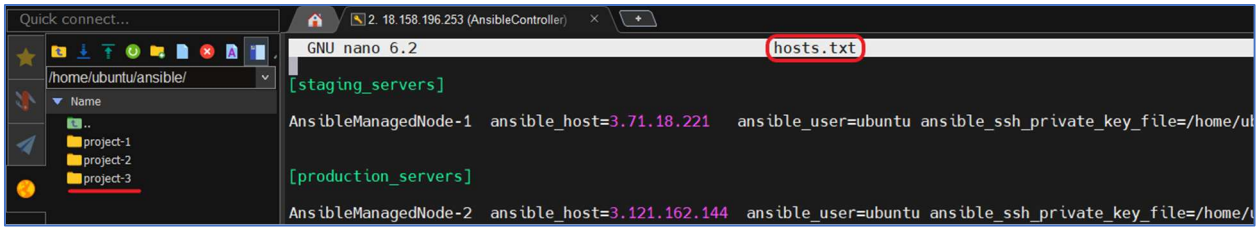
6. My third **Ansible** project (**ansible.cfg**) .

- Creation project directory, file **hosts.txt** with description our managed node's and **ansible.cfg** file with **host_key_checking**, **inventory** parametrs.

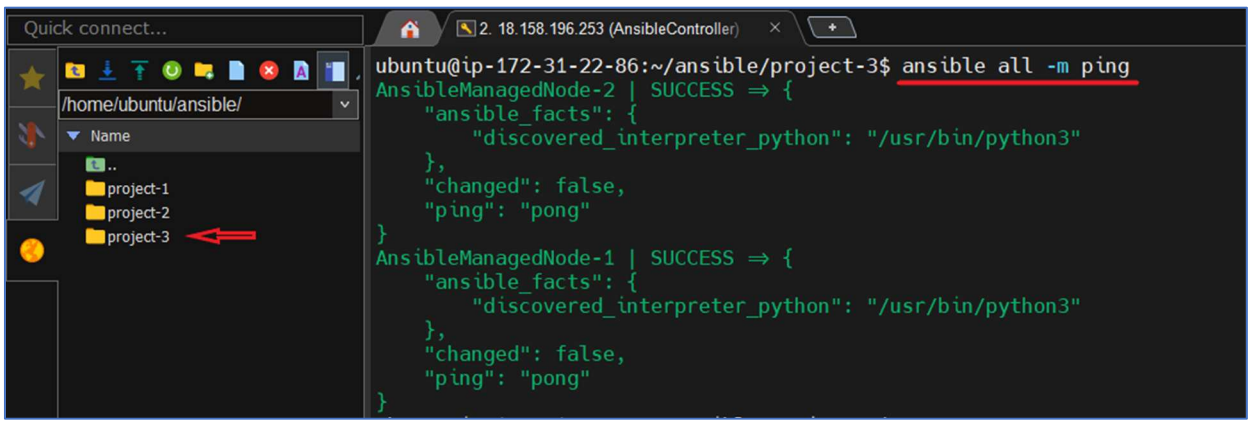
Where :
host_key_checking - set this to "False" if you want to avoid host key checking by the underlying tools Ansible uses to connect to the host.
inventory – relative path to the inventory file.

```
ubuntu@ip-172-31-22-86:~/ansible$ cp -r project-2/ project-3/
ubuntu@ip-172-31-22-86:~/ansible$
ubuntu@ip-172-31-22-86:~/ansible$ ll
total 20
drwxrwxr-x 5 ubuntu ubuntu 4096 Jan  8 09:19 ./
drwxr-x--- 7 ubuntu ubuntu 4096 Jan  8 08:56 ../
drwxrwxr-x 2 ubuntu ubuntu 4096 Jan  8 06:33 project-1/
drwxrwxr-x 2 ubuntu ubuntu 4096 Jan  8 06:53 project-2/
drwxrwxr-x 2 ubuntu ubuntu 4096 Jan  8 09:19 project-3/
ubuntu@ip-172-31-22-86:~/ansible$
ubuntu@ip-172-31-22-86:~/ansible$ cd project-3
ubuntu@ip-172-31-22-86:~/ansible/project-3$
ubuntu@ip-172-31-22-86:~/ansible/project-3$ nano ansible.cfg
```





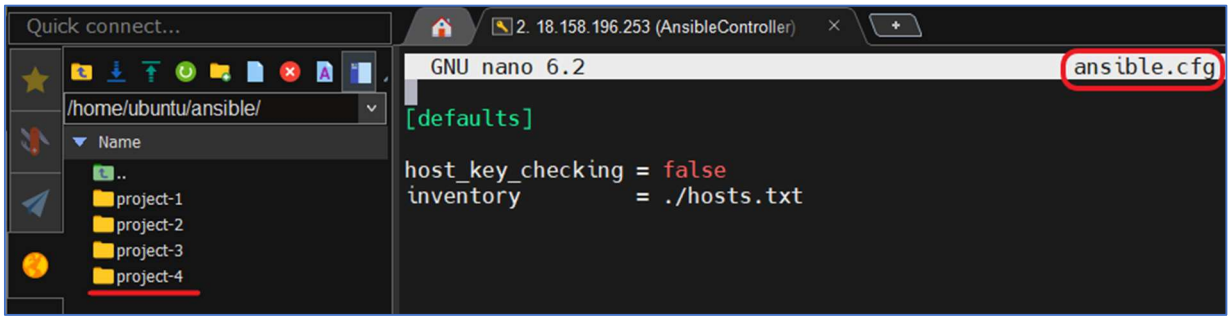
- Run **ansible** command without **-i** option and specifying **inventory file**

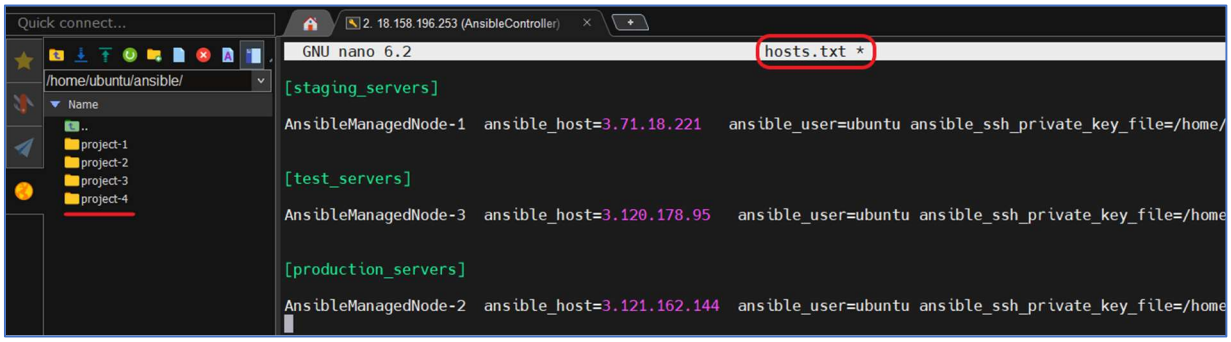


7. My fourth **Ansible** project.

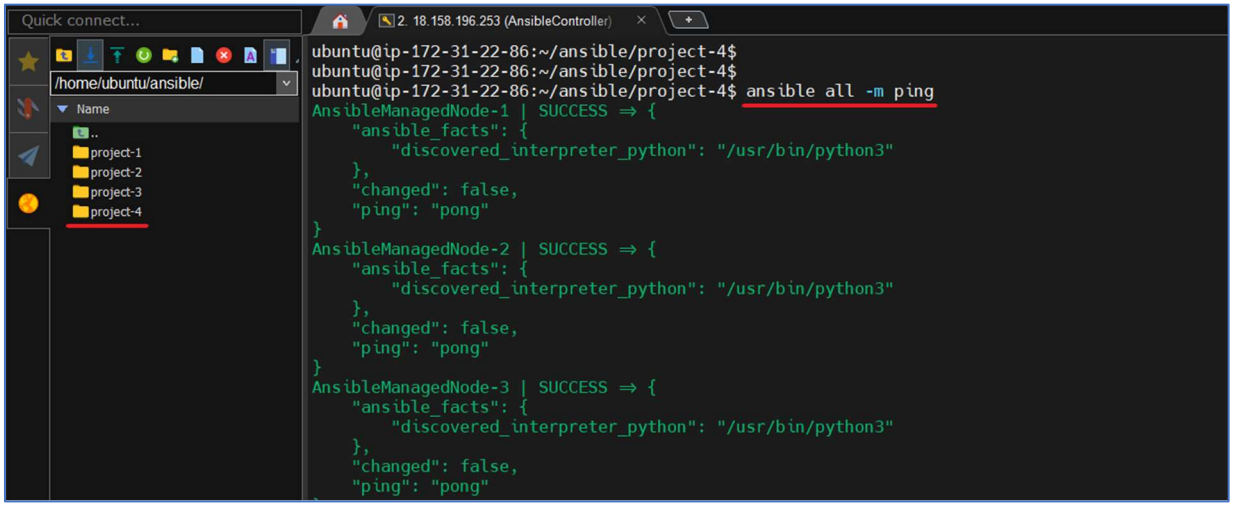
- Creation project directory, file **hosts.txt** with description our managed node's and **ansible.cfg** file with **host_key_checking**, **inventory** parametrs.

```
ubuntu@ip-172-31-22-86:~/ansible$ ll
total 24
drwxrwxr-x 6 ubuntu ubuntu 4096 Jan  8 09:50 ./
drwxr-x--- 7 ubuntu ubuntu 4096 Jan  8 08:56 ../
drwxrwxr-x 2 ubuntu ubuntu 4096 Jan  8 06:33 project-1/
drwxrwxr-x 2 ubuntu ubuntu 4096 Jan  8 06:53 project-2/
drwxrwxr-x 2 ubuntu ubuntu 4096 Jan  8 09:39 project-3/
drwxrwxr-x 2 ubuntu ubuntu 4096 Jan  8 09:49 project-4/
ubuntu@ip-172-31-22-86:~/ansible$ cd project-4/
ubuntu@ip-172-31-22-86:~/ansible/project-4$
ubuntu@ip-172-31-22-86:~/ansible/project-4$ ll
total 16
drwxrwxr-x 2 ubuntu ubuntu 4096 Jan  8 09:49 ./
drwxrwxr-x 6 ubuntu ubuntu 4096 Jan  8 09:50 ../
-rw-rw-r-- 1 ubuntu ubuntu   71 Jan  8 09:49 ansible.cfg
-rw-rw-r-- 1 ubuntu ubuntu  302 Jan  8 09:49 hosts.txt
ubuntu@ip-172-31-22-86:~/ansible/project-4$
ubuntu@ip-172-31-22-86:~/ansible/project-4$ nano hosts.txt
ubuntu@ip-172-31-22-86:~/ansible/project-4$
ubuntu@ip-172-31-22-86:~/ansible/project-4$ nano ansible.cfg
```



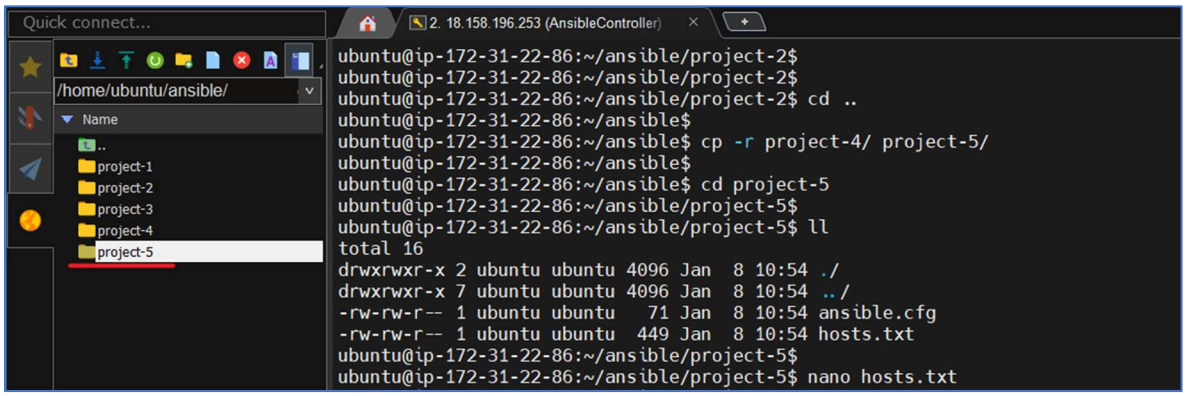


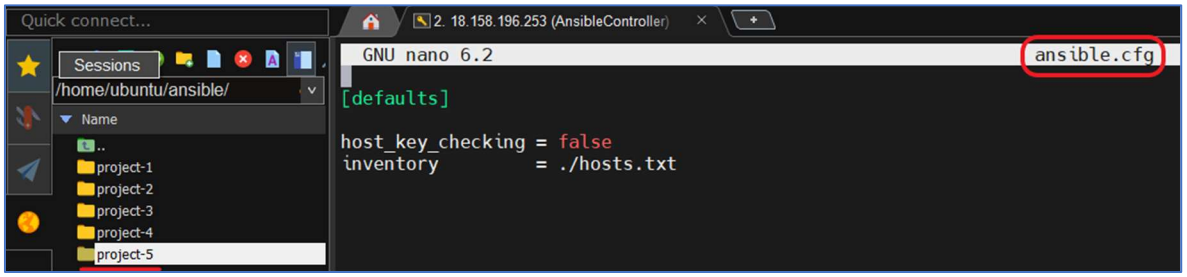
- Run **ansible** command without **-i** option and specifying **inventory file**

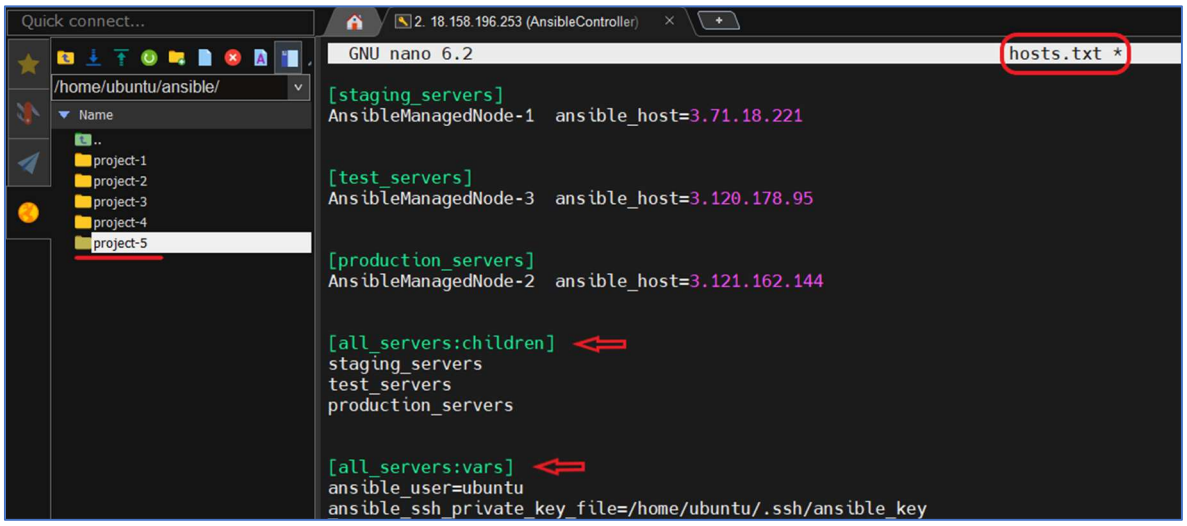


8. My fifth **Ansible** project (**vars, children**).

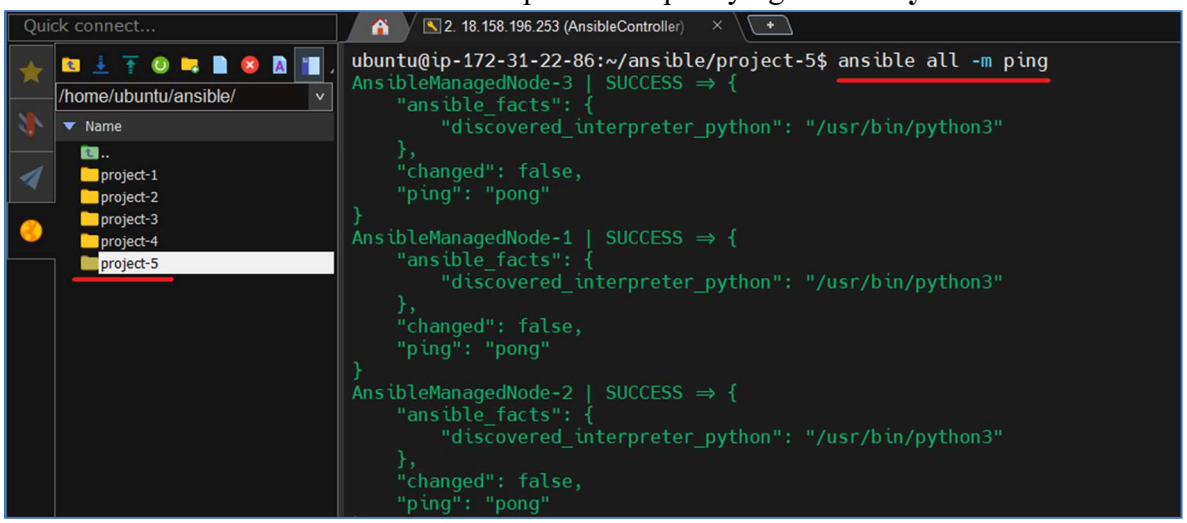
- Creation project directory, file **hosts.txt** with description our managed node's using **vars**, **children** parametrs and **ansible.cfg** file with **host_key_checking**, **inventory** parametrs.







- Run **ansible** command without **-i** option and specifying **inventory file**



- Run **ansible** commands that show **list** and **graph** based on the **inventory file**

```
$ ansible-inventory --list
$ ansible-inventory --graph
```

```
ubuntu@ip-172-31-22-86:~/ansible/project-5$ ansible-inventory --list
{
    "_meta": {
        "hostvars": {
            "AnsibleManagedNode-1": {
                "ansible_host": "3.71.18.221",
                "ansible_ssh_private_key_file": "/home/ubuntu/.ssh/ansible_key",
                "ansible_user": "ubuntu"
            },
            "AnsibleManagedNode-2": {
                "ansible_host": "3.121.162.144",
                "ansible_ssh_private_key_file": "/home/ubuntu/.ssh/ansible_key",
                "ansible_user": "ubuntu"
            },
            "AnsibleManagedNode-3": {
                "ansible_host": "3.120.178.95",
                "ansible_ssh_private_key_file": "/home/ubuntu/.ssh/ansible_key",
                "ansible_user": "ubuntu"
            }
        }
    },
    "all": {
        "children": [
            "all_servers",
            "ungrouped"
        ]
    },
    "all_servers": {
        "children": [
            "production_servers",
            "staging_servers",
            "test_servers"
        ]
    },
    "production_servers": {
        "hosts": [
            "AnsibleManagedNode-2"
        ]
    },
    "staging_servers": {
        "hosts": [
            "AnsibleManagedNode-1"
        ]
    },
    "test_servers": {
        "hosts": [
            "AnsibleManagedNode-3"
        ]
    }
}
```

```
ubuntu@ip-172-31-22-86:~/ansible/project-5$ ansible-inventory --graph
@all:
  |--@all_servers:
  |  |--@production_servers:
  |  |  |--AnsibleManagedNode-2
  |  |--@staging_servers:
  |  |  |--AnsibleManagedNode-1
  |  |--@test_servers:
  |  |  |--AnsibleManagedNode-3
  |--@ungrouped:
```

- Run **ansible** command with **setup** module.

```
$ ansible staging_servers -m setup
```

Where :
staging_servers – name of the grouped servers from the inventory file.
setup – module that outputs information about Ansible Managed Node's .

```
ubuntu@ip-172-31-22-86:~/ansible/project-5$ ansible staging_servers -m setup
AnsibleManagedNode-1 | SUCCESS => {
    "ansible_facts": {
        "ansible_all_ipv4_addresses": [
            "172.31.25.100"
        ],
        "ansible_all_ipv6_addresses": [
            "fe80::cc:d9ff:feba:d004"
        ],
        "ansible_apparmor": {
            "status": "enabled"
        },
        "ansible_architecture": "x86_64",
        "ansible_bios_date": "08/24/2006",
        "ansible_bios_vendor": "Xen",
        "ansible_bios_version": "4.11.amazon",
        "ansible_board_asset_tag": "NA",
        "ansible_board_name": "NA",
        "ansible_board_serial": "NA",
        "ansible_board_vendor": "NA",
        "ansible_board_version": "NA",
        "ansible_chassis_asset_tag": "NA",
        "ansible_chassis_serial": "NA",
        "ansible_chassis_vendor": "Xen",
        "ansible_chassis_version": "NA",
        "ansible_cmdline": {
            "BOOT_IMAGE": "/boot/vmlinuz-5.15.0-1026-aws",
```

- Run **ansible** command with **shell** module and **uptime** argument.

```
$ ansible all -m shell -a "uptime"
```

Where :
all – for all servers from the inventory file.
shell – a module that runs the shell on all servers.
"**uptime**" – an argument: command that is executed in shells on each servers group all

```
ubuntu@ip-172-31-22-86:~/ansible/project-5$ ansible all -m shell -a "uptime"
AnsibleManagedNode-1 | CHANGED | rc=0 >>
 11:40:02 up  6:04,  1 user,  load average: 0.00, 0.00, 0.00
AnsibleManagedNode-2 | CHANGED | rc=0 >>
 11:40:02 up  6:04,  1 user,  load average: 0.08, 0.02, 0.01
AnsibleManagedNode-3 | CHANGED | rc=0 >>
 11:40:02 up  6:04,  1 user,  load average: 0.00, 0.00, 0.00
```

- Run **ansible** command that copies the file to all Ansible Managed Node's.

```
$ echo "Hello World!" > hello.txt
$ ansible all -m copy -a "src=hello.txt dest=/home" -b
```

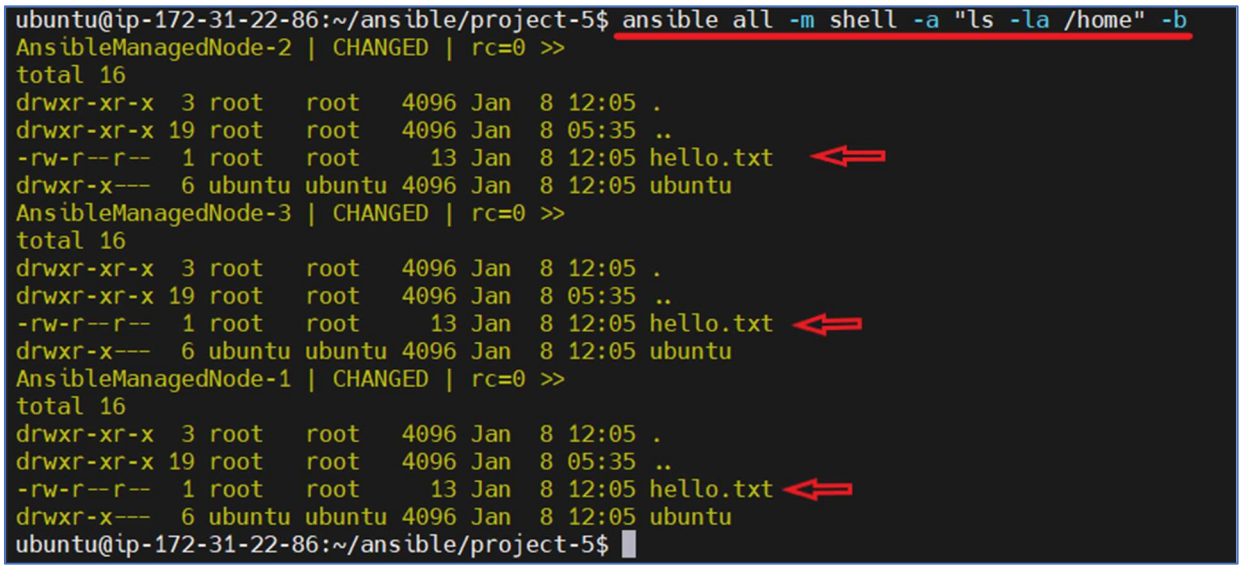
Where :
all – for all servers from the inventory file.
copy – a module that copies file from Ansible Control to the Ansible Managed Node's.
"src" – an argument: the relative path to the file hello.txt on the Ansible Control Node
"dest" – an argument: absolute path on the Managed Node where hello.txt must be copied
"-b" – an option: run operations as this user (default=root)

```
ubuntu@ip-172-31-22-86:~/ansible/project-5$ echo "Hello World!" > hello.txt
ubuntu@ip-172-31-22-86:~/ansible/project-5$
ubuntu@ip-172-31-22-86:~/ansible/project-5$ ll
total 20
drwxrwxr-x 2 ubuntu ubuntu 4096 Jan  8 12:04 ./
drwxrwxr-x 7 ubuntu ubuntu 4096 Jan  8 10:54 ../
-rw-rw-r-- 1 ubuntu ubuntu   71 Jan  8 10:54 ansible.cfg
-rw-rw-r-- 1 ubuntu ubuntu   13 Jan  8 12:04 hello.txt
-rw-rw-r-- 1 ubuntu ubuntu  376 Jan  8 11:07 hosts.txt
ubuntu@ip-172-31-22-86:~/ansible/project-5$
ubuntu@ip-172-31-22-86:~/ansible/project-5$ cat hello.txt
Hello World!
ubuntu@ip-172-31-22-86:~/ansible/project-5$
ubuntu@ip-172-31-22-86:~/ansible/project-5$ ansible all -m copy -a "src=hello.txt dest=/home" -b
AnsibleManagedNode-3 | CHANGED => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "changed": true,
    "checksum": "a0b65939670bc2c010f4d5d6a0b3e4e4590fb92b",
    "dest": "/home/hello.txt",
    "gid": 0,
    "group": "root",
    "md5sum": "8ddd8be4b179a529afa5f2ffae4b9858",
    "mode": "0644",
    "owner": "root",
    "size": 13,
    "src": "/home/ubuntu/.ansible/tmp/ansible-tmp-1673179554.1568837-4314-60291496338293/source"
,
    "state": "file",
    "uid": 0
}
AnsibleManagedNode-1 | CHANGED => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "changed": true,
    "checksum": "a0b65939670bc2c010f4d5d6a0b3e4e4590fb92b",
    "dest": "/home/hello.txt",
    "gid": 0,
    "group": "root",
    "md5sum": "8ddd8be4b179a529afa5f2ffae4b9858",
    "mode": "0644",
    "owner": "root",
    "size": 13,
    "src": "/home/ubuntu/.ansible/tmp/ansible-tmp-1673179554.1690552-4313-19861402793851/source"
,
    "state": "file",
    "uid": 0
}
AnsibleManagedNode-2 | CHANGED => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "changed": true,
    "checksum": "a0b65939670bc2c010f4d5d6a0b3e4e4590fb92b",
    "dest": "/home/hello.txt",
    "gid": 0,
    "group": "root",
    "md5sum": "8ddd8be4b179a529afa5f2ffae4b9858",
```

- Run **ansible** command that checking copy command from previous point.

```
$ ansible all -m shell -a "ls -la /home" -b
```

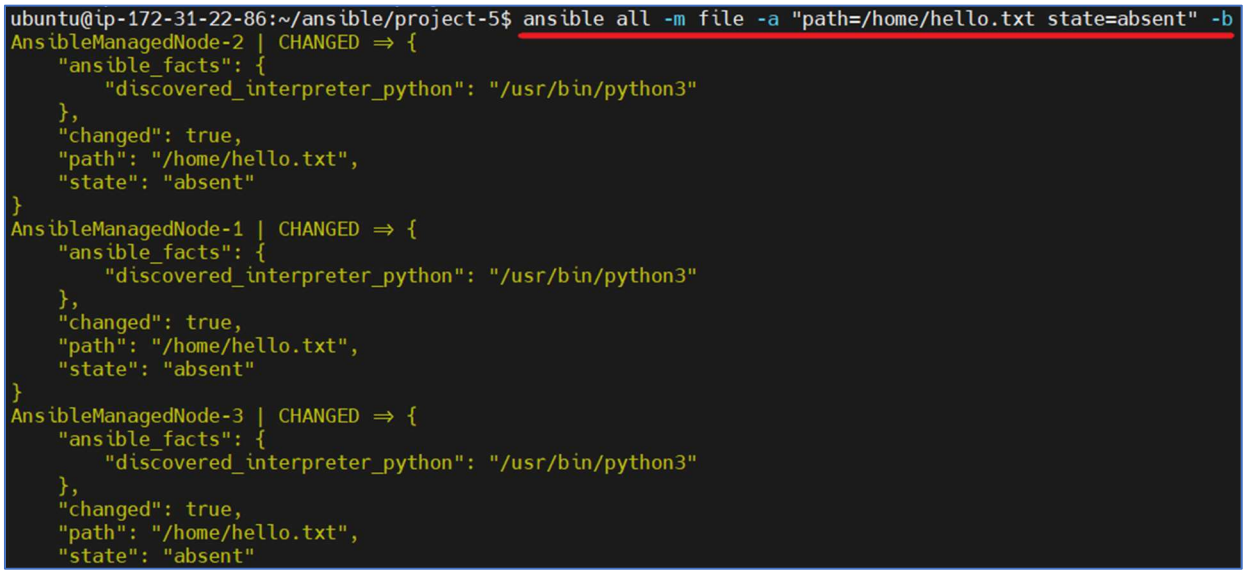
Where :
all – for all servers from the inventory file.
shell – module that runs the shell on all servers.
"ls -la /home" – argument:output the content **/home** on the Ansible Managed Node
"-b" – option: run operations as this user (default=root)



- Run **ansible** command that delete hello.txt file from Ansible managed Node's.

```
$ ansible all -m file -a "path=/home/hello.txt state=absent" -b
```

Where :
file – module that manage files and file properties.
"path" – argument: path to the file being managed on the Ansible Managed Node
"state" – argument: if absent, directories will be recursively deleted.



- Run **ansible** command that install Apache Web Server on the Ansible Managed Node's.

```
$ ansible production_servers -m apt -a "name=apache2 state=latest" -b
```

Where :
apt – module that manages apt packages (such as for Debian/Ubuntu).
"name" – argument: a list of package names.
"state" – argument: indicates the desired package state. *latest* ensures that the latest version is installed.

```
ubuntu@ip-172-31-22-86:~/ansible/project-5$ ansible production_servers -m apt -a
"name=apache2 state=latest" -b
AnsibleManagedNode-2 | CHANGED => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "cache_update_time": 1673173644,
    "cache_updated": false,
    "changed": true,
    "stderr": "",
    "stderr_lines": [],
    "stdout": "Reading package lists ... \nBuilding dependency tree ... \nReading sta
```

```
        "Created symlink /etc/systemd/system/multi-user.target.wants/apache2.serv
ice → /lib/systemd/system/apache2.service.",
        "Created symlink /etc/systemd/system/multi-user.target.wants/apache-htcac
heclean.service → /lib/systemd/system/apache-htcacheclean.service.",
        "Processing triggers for ufw (0.36.1-4build1) ...",
        "Processing triggers for man-db (2.10.2-1) ...",
        "Processing triggers for libc-bin (2.35-0ubuntu3.1) ...",
        "NEEDRESTART-VER: 3.5",
        "NEEDRESTART-KCUR: 5.15.0-1026-aws",
        "NEEDRESTART-KEXP: 5.15.0-1026-aws",
        "NEEDRESTART-KSTA: 1"
    ]
}
ubuntu@ip-172-31-22-86:~/ansible/project-5$ ansible production_servers -m apt -a "name=apache2 state=latest" -b
AnsibleManagedNode-2 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "cache_update_time": 1673173644,
    "cache_updated": false,
    "changed": false
}
```

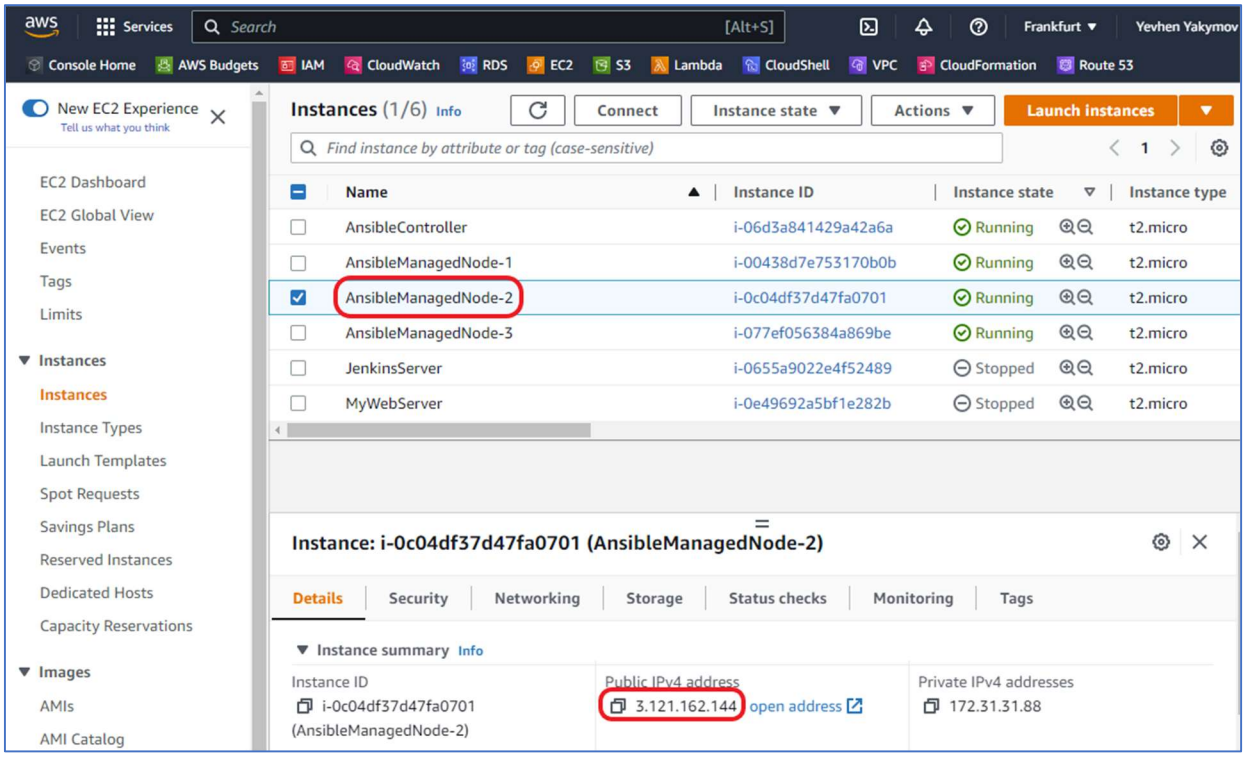
- Run **ansible** command that start and enable Apache Web Server on the Ansible Managed.

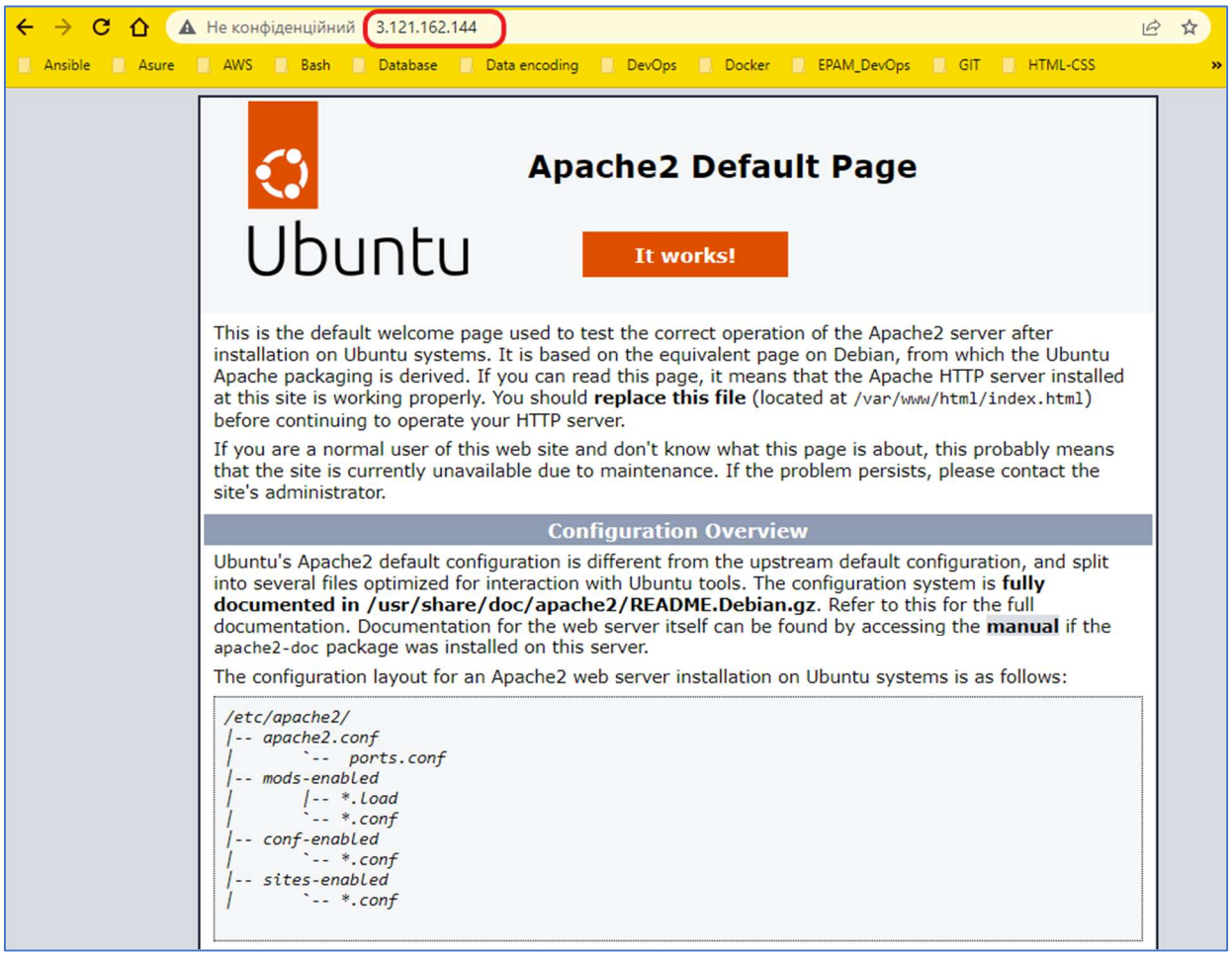
```
$ ansible production_servers -m service -a "name=apache2
state=started enabled=yes" -b
```

Where :
service – module controls services on remote hosts.
"name" – argument: a list of package names.
"state" – argument: started/stopped are idempotent actions that will not run commands unless necessary. At least one of state and enabled are required

```
ubuntu@ip-172-31-22-86:~/ansible/project-5$ ansible production_servers -m service -a "name=apache2 state=started enabled=yes" -b
AnsibleManagedNode-2 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "changed": false,
    "enabled": true,
    "name": "apache2",
    "state": "started",
    "status": {
        "ActiveEnterTimestamp": "Sun 2023-01-08 12:48:11 UTC",
```

- Checking that our Apache Web Server is running.

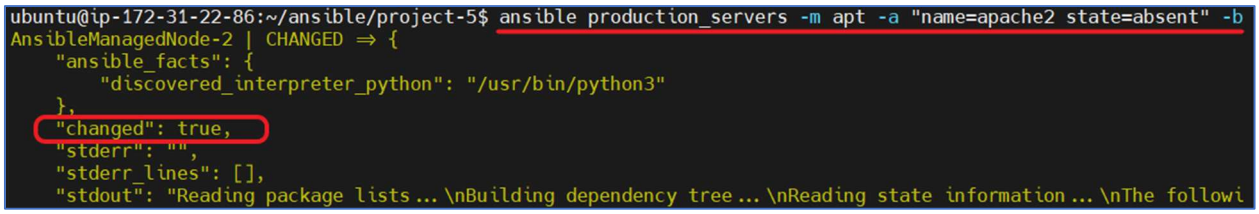


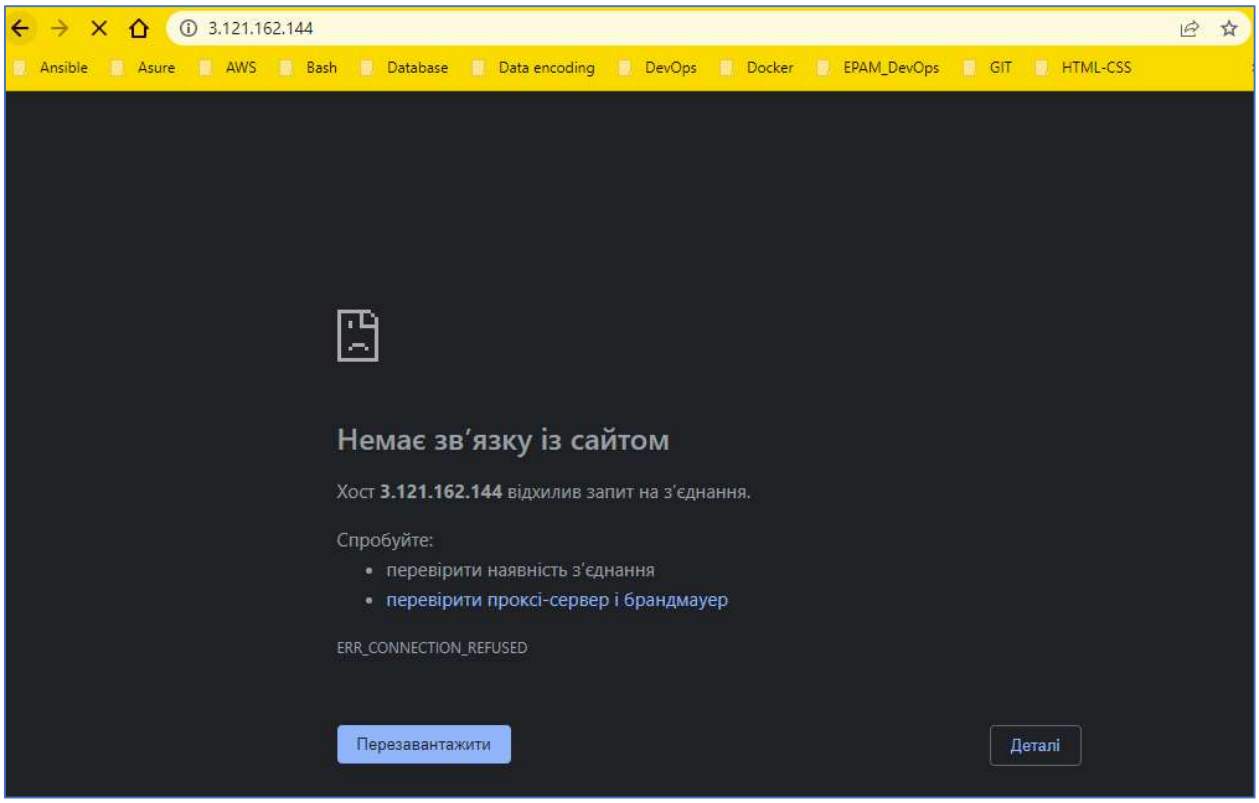


- Remove Apache Web Server from Ansible Managed Node.

```
$ ansible production_servers -m apt -a "name=apache2 state=absent" -b
```

Where :
apt – module that manages apt packages (such as for Debian/Ubuntu).
“name” – argument: a list of package names.
“state” – argument: *absent* will remove the specified package.



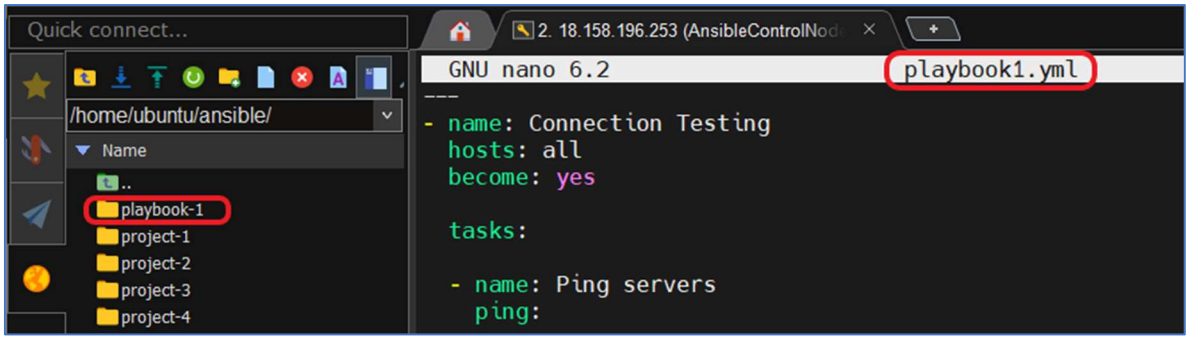


9. My first **Ansible** playbook.

Task: Test connection to all servers, owned by your organization.

- Creation first **playbook1.yml**

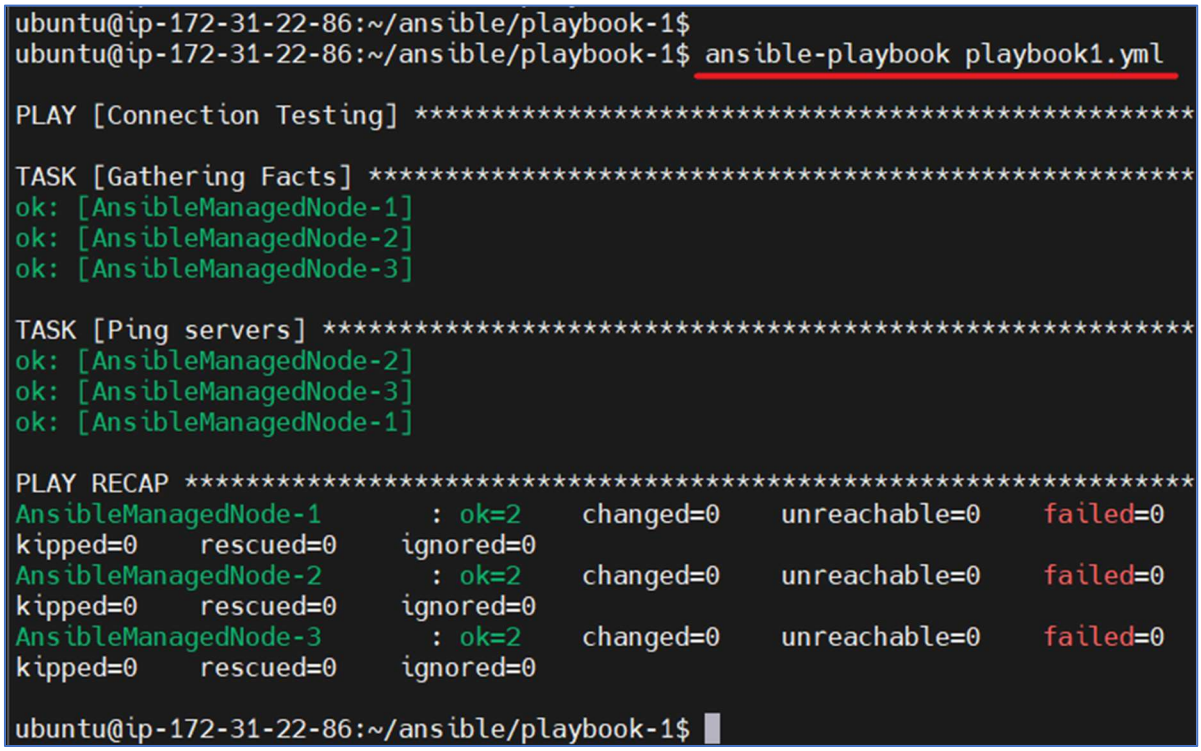
```
ubuntu@ip-172-31-22-86:~/ansible$
ubuntu@ip-172-31-22-86:~/ansible$ mkdir playbook-1/
ubuntu@ip-172-31-22-86:~/ansible$ cd playbook-1/
ubuntu@ip-172-31-22-86:~/ansible/playbook-1$
ubuntu@ip-172-31-22-86:~/ansible/playbook-1$ nano playbook1.yml
```




```
ubuntu@ip-172-31-22-86:~/ansible/playbook-1$ ll
total 20
drwxrwxr-x 2 ubuntu ubuntu 4096 Jan  8 17:15 ./
drwxrwxr-x 8 ubuntu ubuntu 4096 Jan  8 17:04 ../
-rw-rw-r-- 1 ubuntu ubuntu   71 Jan  8 17:15 ansible.cfg
-rw-rw-r-- 1 ubuntu ubuntu  376 Jan  8 17:15 hosts.txt
-rw-rw-r-- 1 ubuntu ubuntu  104 Jan  8 17:07 playbook1.yml
ubuntu@ip-172-31-22-86:~/ansible/playbook-1$ cat ansible.cfg

[defaults]

host_key_checking = false
inventory         = ./hosts.txt
ubuntu@ip-172-31-22-86:~/ansible/playbook-1$
ubuntu@ip-172-31-22-86:~/ansible/playbook-1$
ubuntu@ip-172-31-22-86:~/ansible/playbook-1$ cat hosts.txt

[staging_servers]
AnsibleManagedNode-1  ansible_host=3.71.18.221


[test_servers]
AnsibleManagedNode-3  ansible_host=3.120.178.95


[production_servers]
AnsibleManagedNode-2  ansible_host=3.121.162.144


[all_servers:children]
staging_servers
test_servers
production_servers


[all_servers:vars]
ansible_user=ubuntu
ansible_ssh_private_key_file=/home/ubuntu/.ssh/ansible_key
```

- Run **ansible-playbook** command.

```
$ ansible-playbook playbook1.yml
```



10. My second **Ansible** playbook.

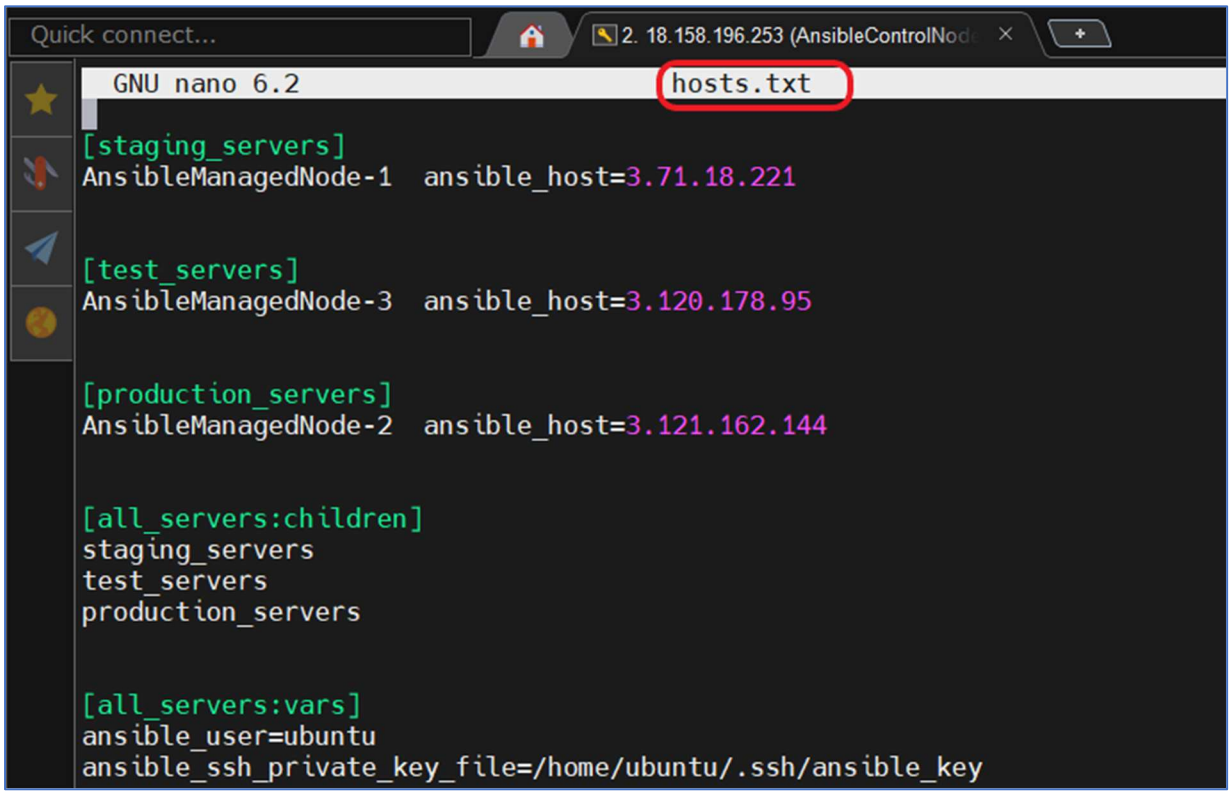
Task: Install Apache Web Server on all servers, owned by your organization. Also needed to start Apache Web Server and enable it during boot.

- Creation project directory, file **hosts.txt** with description our managed node's and **ansible.cfg** file with **host_key_checking**, **inventory** parametrs and **playbook2.yml** with Apache Web Server instalation.

```
ubuntu@ip-172-31-22-86:~/ansible$ cp -r playbook-1/ playbook-2/
ubuntu@ip-172-31-22-86:~/ansible$
ubuntu@ip-172-31-22-86:~/ansible$ cd playbook-2/
ubuntu@ip-172-31-22-86:~/ansible/playbook-2$
ubuntu@ip-172-31-22-86:~/ansible/playbook-2$ mv playbook1.yml playbook2.yml
ubuntu@ip-172-31-22-86:~/ansible/playbook-2$
ubuntu@ip-172-31-22-86:~/ansible/playbook-2$ ll
total 20
drwxrwxr-x 2 ubuntu ubuntu 4096 Jan  8 17:29 ./
drwxrwxr-x 9 ubuntu ubuntu 4096 Jan  8 17:29 ../
-rw-rw-r-- 1 ubuntu ubuntu   71 Jan  8 17:29 ansible.cfg
-rw-rw-r-- 1 ubuntu ubuntu  376 Jan  8 17:29 hosts.txt
-rw-rw-r-- 1 ubuntu ubuntu  104 Jan  8 17:29 playbook2.yml
ubuntu@ip-172-31-22-86:~/ansible/playbook-2$
ubuntu@ip-172-31-22-86:~/ansible/playbook-2$ nano playbook2.yml
```

```
Quick connect...   2. 18.158.196.253 (AnsibleControlNod
  GNU nano 6.2                    playbook2.yml *
---
- name: Connection Testing
  hosts: all
  become: yes

  tasks:

  - name: Install Apache Web Server
    apt:
      name: apache2
      state: latest

  - name: Start Apache and enable it during boot
    service:
      name:  apsche2
      state:  started
      enabled:  yes
```

```
Quick connect...   2. 18.158.196.253 (AnsibleControlNod
  GNU nano 6.2                    ansible.cfg
[defaults]

host_key_checking = false
inventory         = ./hosts.txt
```

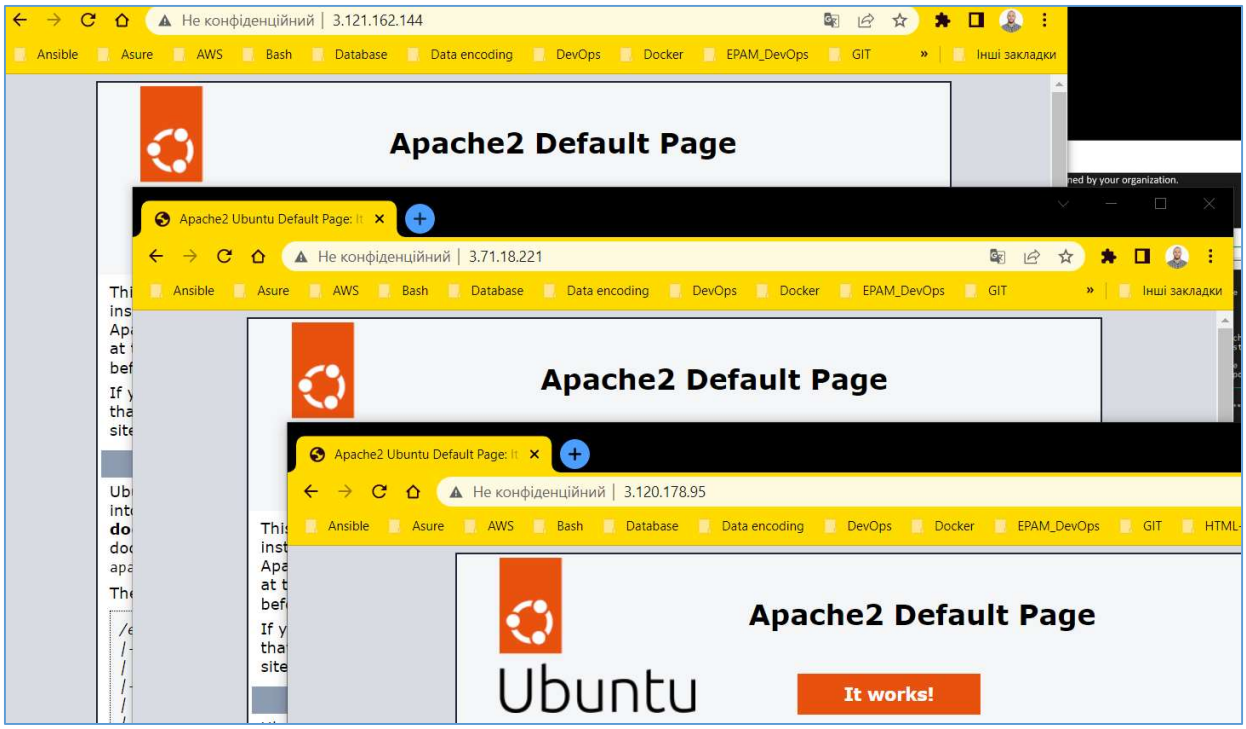


- Run **ansible-playbook** command.

```
$ ansible-playbook playbook2.yml
```

```
ubuntu@ip-172-31-22-86:~/ansible/playbook-2$ ansible-playbook playbook2.yml

PLAY [Connection Testing] ******************************************************

TASK [Gathering Facts] *********************************************************
ok: [AnsibleManagedNode-2]
ok: [AnsibleManagedNode-1]
ok: [AnsibleManagedNode-3]

TASK [Install Apache Web Server] ***********************************************
changed: [AnsibleManagedNode-2]
changed: [AnsibleManagedNode-3]
changed: [AnsibleManagedNode-1]

TASK [Start Apache and enable it during boot] **********************************
ok: [AnsibleManagedNode-2]
ok: [AnsibleManagedNode-3]
ok: [AnsibleManagedNode-1]

PLAY RECAP *********************************************************************
AnsibleManagedNode-1       : ok=3    changed=0    unreachable=0    failed=0
kipped=0    rescued=0    ignored=0
AnsibleManagedNode-2       : ok=3    changed=0    unreachable=0    failed=0
kipped=0    rescued=0    ignored=0
AnsibleManagedNode-3       : ok=3    changed=0    unreachable=0    failed=0
kipped=0    rescued=0    ignored=0
```

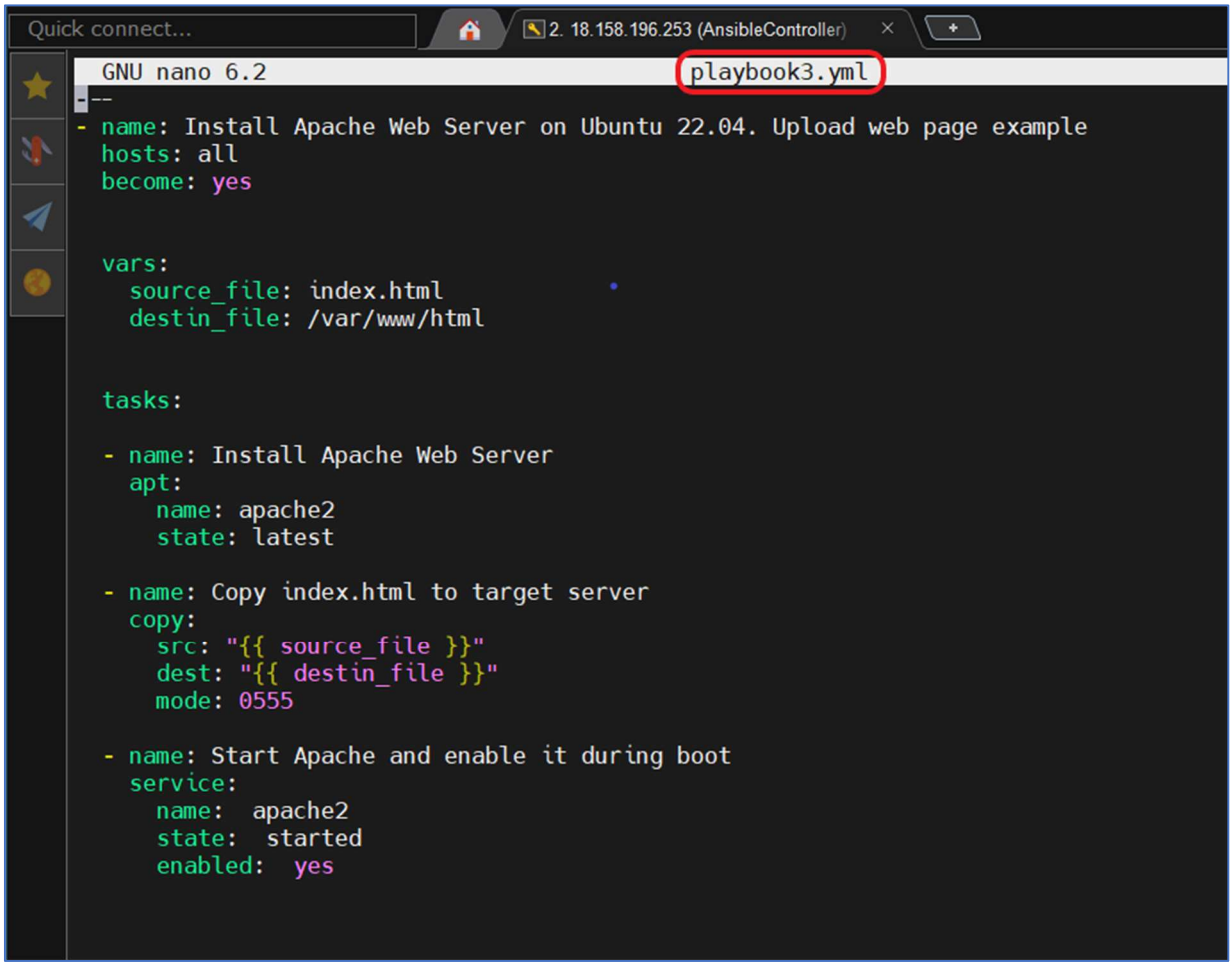
- Checking the availability of the Apache 2 default page on all Ansible Managed Node's.



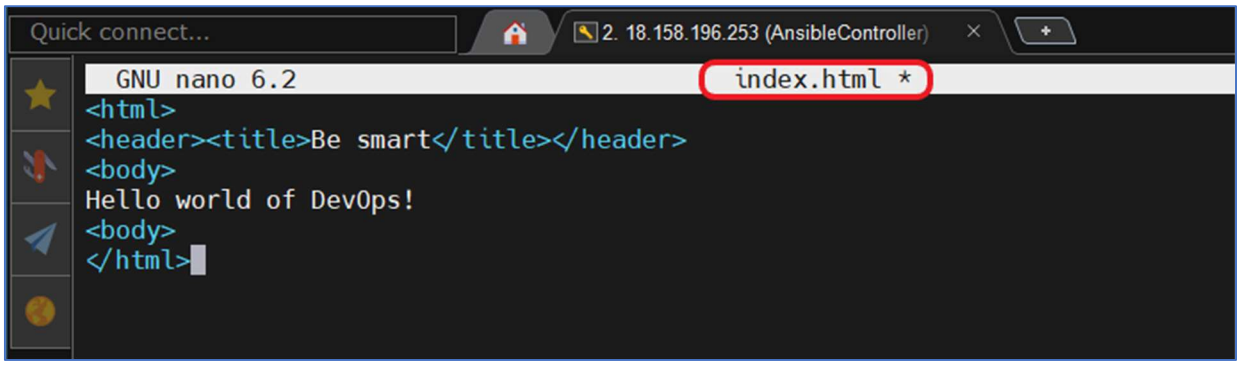
11. My third **Ansible** playbook.

Task: Install Apache Web Server on all servers, owned by your organization. Also needed to start Apache Web Server and enable it during boot. Also needed to change default index.html

- Creation **playbook3.yml** with Apache Web Server instalation and copying **index.html**.



- Creation **index.html** file.



- Working directoryof the project **playbook-3**.

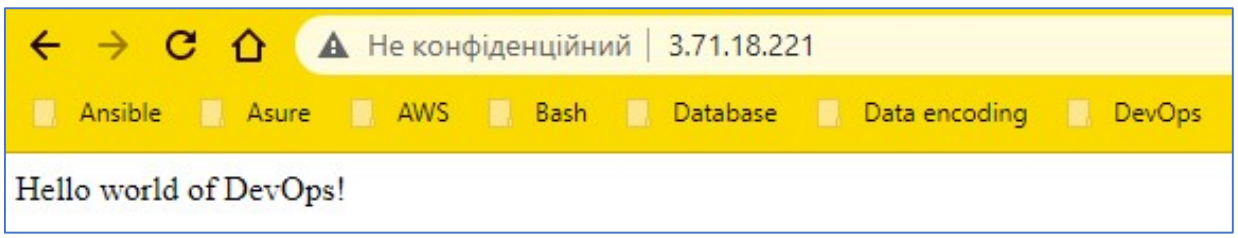
```
ubuntu@ip-172-31-22-86:~/ansible/playbook-3$ ll
total 24
drwxrwxr-x  2 ubuntu ubuntu 4096 Jan  8 18:49 ./
drwxrwxr-x 10 ubuntu ubuntu 4096 Jan  8 18:37 ../
-rw-rw-r--  1 ubuntu ubuntu   71 Jan  8 18:37 ansible.cfg
-rw-rw-r--  1 ubuntu ubuntu  376 Jan  8 18:37 hosts.txt
-rw-rw-r--  1 ubuntu ubuntu   93 Jan  8 18:49 index.html
-rw-rw-r--  1 ubuntu ubuntu  530 Jan  8 18:45 playbook3.yml
ubuntu@ip-172-31-22-86:~/ansible/playbook-3$
ubuntu@ip-172-31-22-86:~/ansible/playbook-3$
```

- Run **ansible-playbook** command.

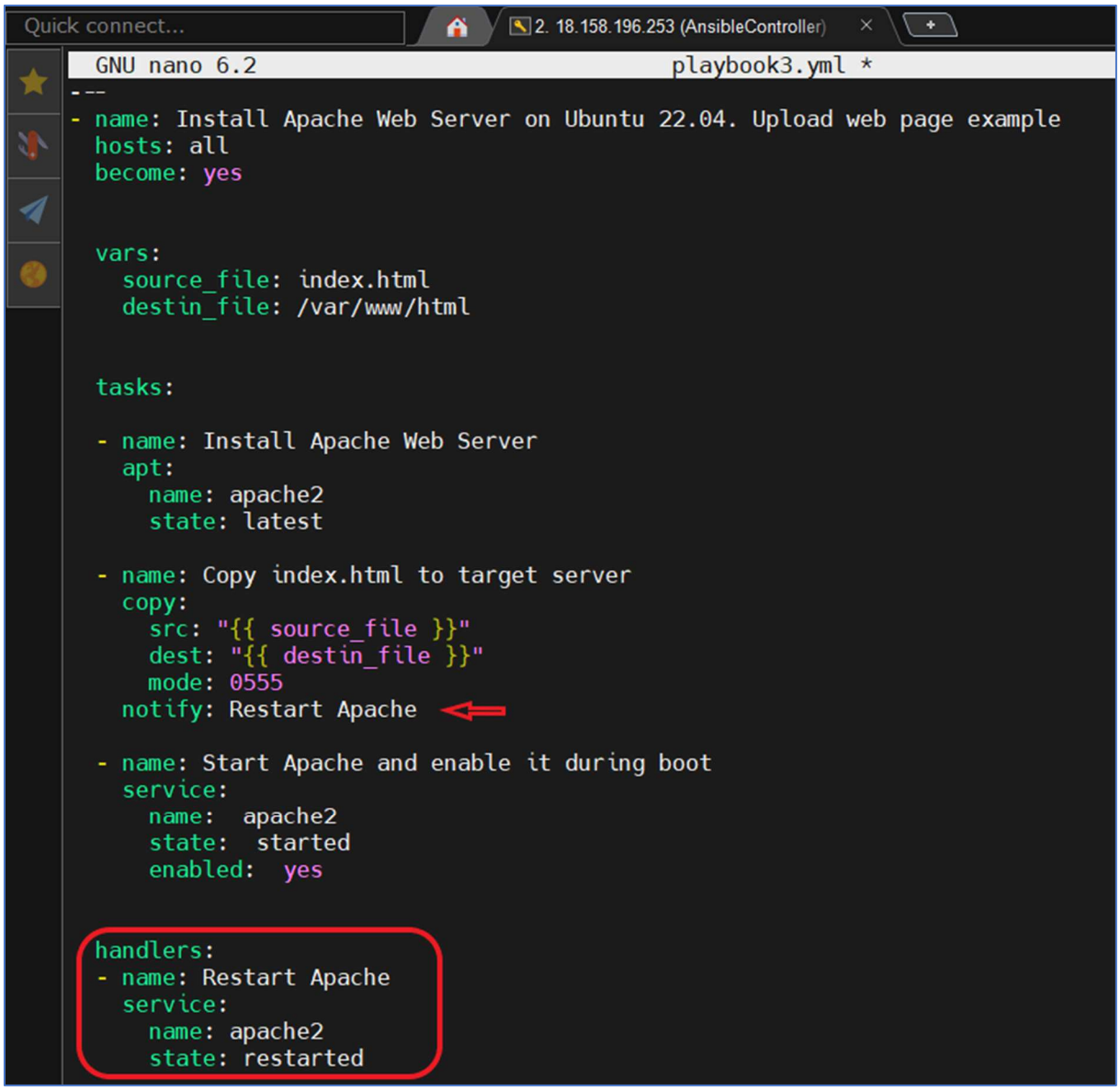
```
$ ansible-playbook playbook3.yml
```

```
ubuntu@ip-172-31-22-86:~/ansible/playbook-3$
ubuntu@ip-172-31-22-86:~/ansible/playbook-3$ ansible-playbook playbook3.yml

PLAY [Install Apache Web Server on Ubuntu 22.04. Upload web page example] ***************

TASK [Gathering Facts] *********************************************************************
ok: [AnsibleManagedNode-2]
ok: [AnsibleManagedNode-3]
ok: [AnsibleManagedNode-1]

TASK [Install Apache Web Server] ***********************************************************
changed: [AnsibleManagedNode-1]
changed: [AnsibleManagedNode-2]
changed: [AnsibleManagedNode-3]

TASK [Copy index.html to target server] ****************************************************
changed: [AnsibleManagedNode-2]
changed: [AnsibleManagedNode-1]
changed: [AnsibleManagedNode-3]

TASK [Start Apache and enable it during boot] **********************************************
ok: [AnsibleManagedNode-3]
ok: [AnsibleManagedNode-2]
ok: [AnsibleManagedNode-1]

PLAY RECAP *********************************************************************************
AnsibleManagedNode-1       : ok=4    changed=2    unreachable=0    failed=0    skipped=0
d=0    ignored=0
AnsibleManagedNode-2       : ok=4    changed=2    unreachable=0    failed=0    skipped=0
d=0    ignored=0
AnsibleManagedNode-3       : ok=4    changed=2    unreachable=0    failed=0    skipped=0
d=0    ignored=0

ubuntu@ip-172-31-22-86:~/ansible/playbook-3$
```

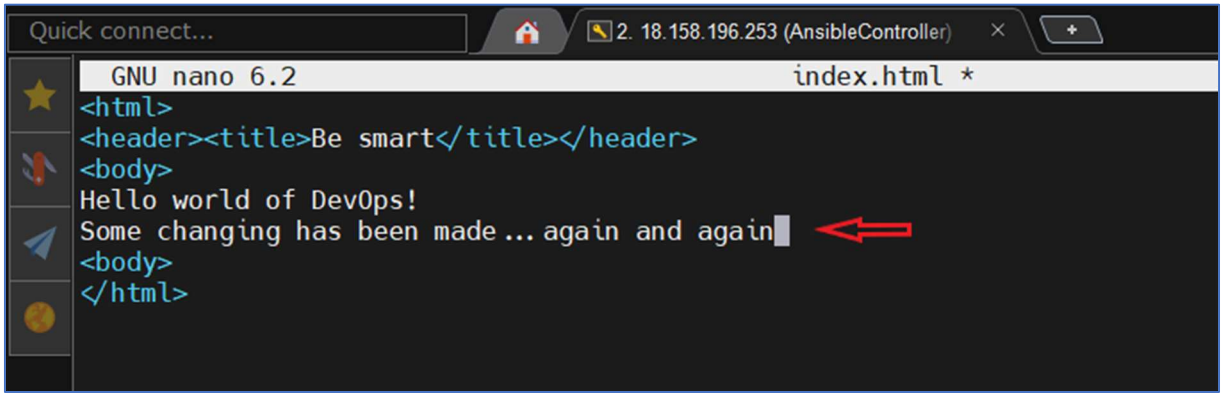
- Checking the availability of the **index.html** page on all Ansible Managed Node's.



- Restart **Apache** after copying **index.html** to the Ansible Managed Node's using **notify** and **handlers**.



- Changing **index.html** file.

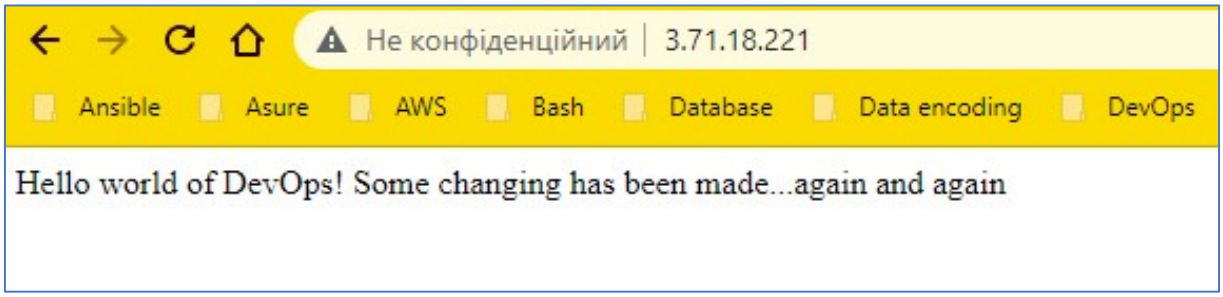


- Run **ansible-playbook** command.

```
$ ansible-playbook playbook3.yml
```

```
ubuntu@ip-172-31-22-86:~/ansible/playbook-3$
ubuntu@ip-172-31-22-86:~/ansible/playbook-3$ ansible-playbook playbook3.yml

PLAY [Install Apache Web Server on Ubuntu 22.04. Upload web page example] ***************

TASK [Gathering Facts] *****************************************************************
ok: [AnsibleManagedNode-2]
ok: [AnsibleManagedNode-3]
ok: [AnsibleManagedNode-1]

TASK [Install Apache Web Server] *******************************************************
ok: [AnsibleManagedNode-3]
ok: [AnsibleManagedNode-2]
ok: [AnsibleManagedNode-1]

TASK [Copy index.html to target server] ************************************************
changed: [AnsibleManagedNode-3]
changed: [AnsibleManagedNode-1]
changed: [AnsibleManagedNode-2]

TASK [Start Apache and enable it during boot] ******************************************
ok: [AnsibleManagedNode-3]
ok: [AnsibleManagedNode-1]
ok: [AnsibleManagedNode-2]

RUNNING HANDLER [Restart Apache] *******************************************************
changed: [AnsibleManagedNode-1]
changed: [AnsibleManagedNode-3]
changed: [AnsibleManagedNode-2]

PLAY RECAP *****************************************************************************
AnsibleManagedNode-1       : ok=5    changed=2    unreachable=0    failed=0    skipped=0
d=0    ignored=0
AnsibleManagedNode-2       : ok=5    changed=2    unreachable=0    failed=0    skipped=0
d=0    ignored=0
AnsibleManagedNode-3       : ok=5    changed=2    unreachable=0    failed=0    skipped=0
d=0    ignored=0

ubuntu@ip-172-31-22-86:~/ansible/playbook-3$
```

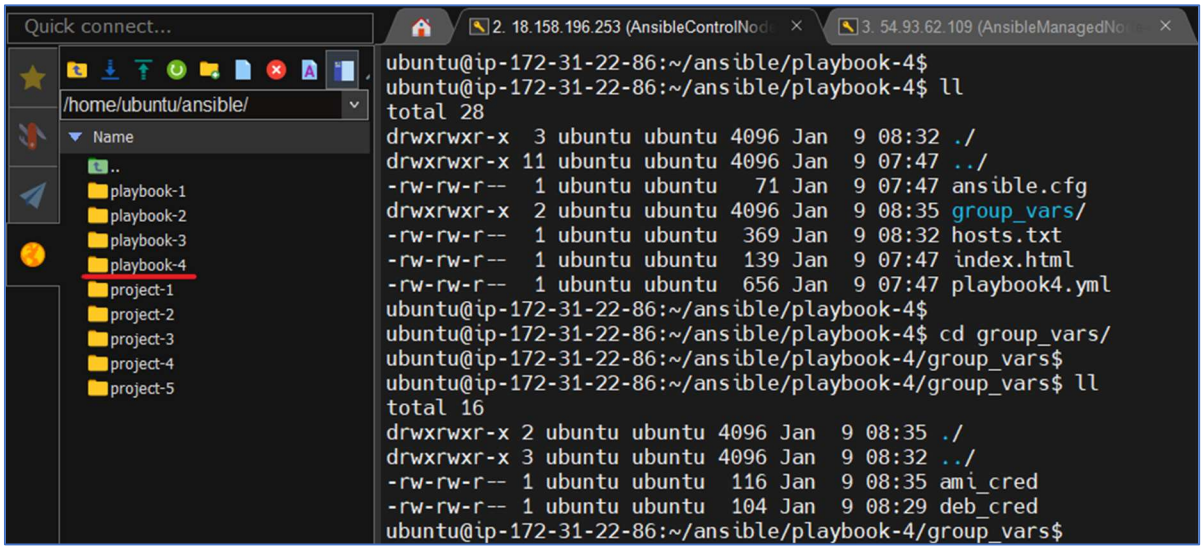
- Checking the availability of the **index.html** page on all Ansible Managed Node's.

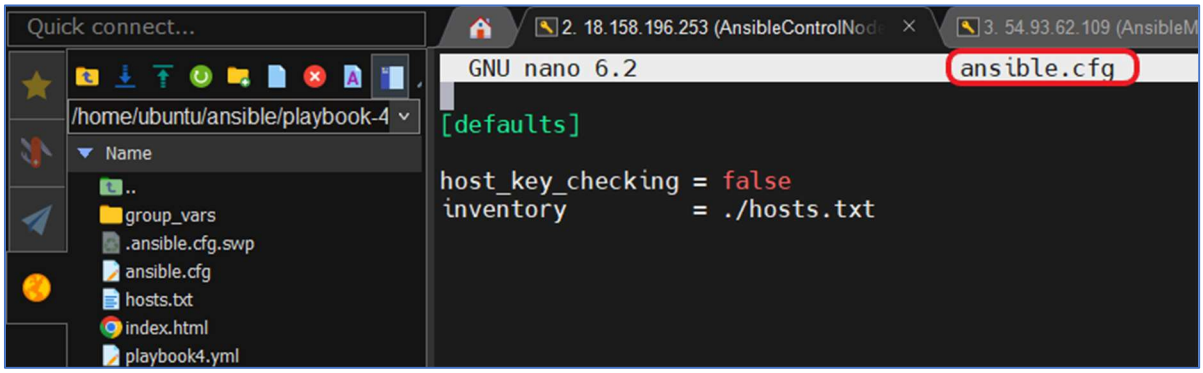


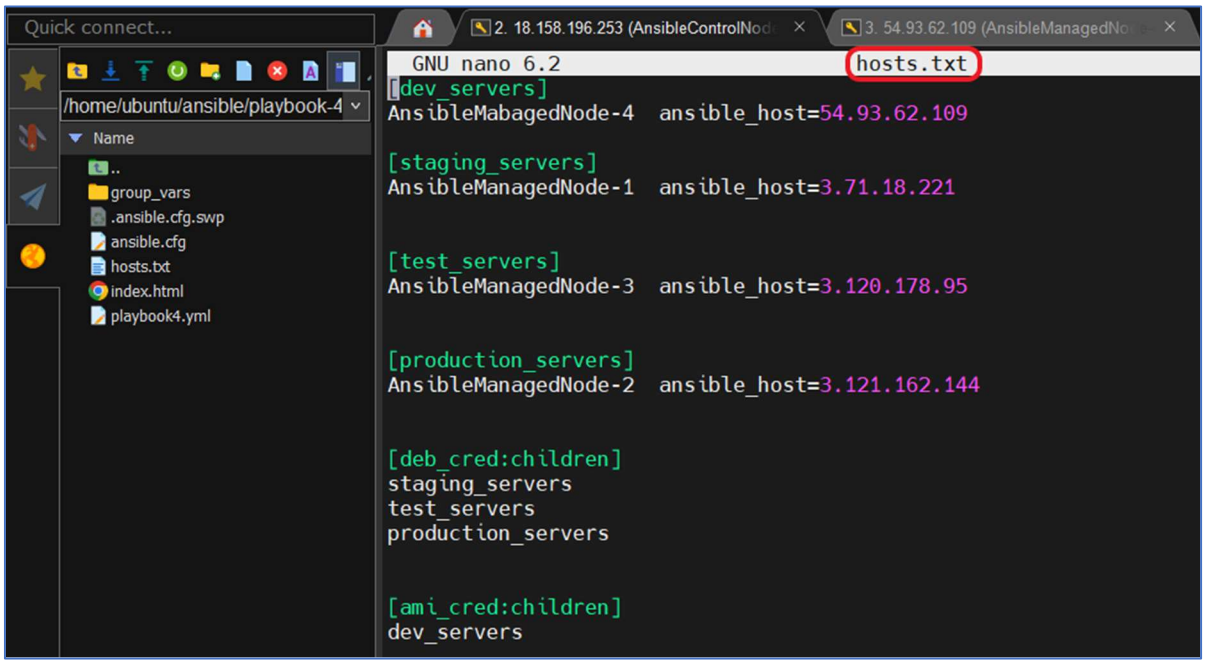
12. My fourth **Ansible** playbook.

Task: Install Apache Web Server on all servers, owned by your organization. Also needed to start Apache Web Server and enable it during boot. Also needed to change default index.html. Servers are on different Linux-based OS(Amazon Linux and Ubuntu).

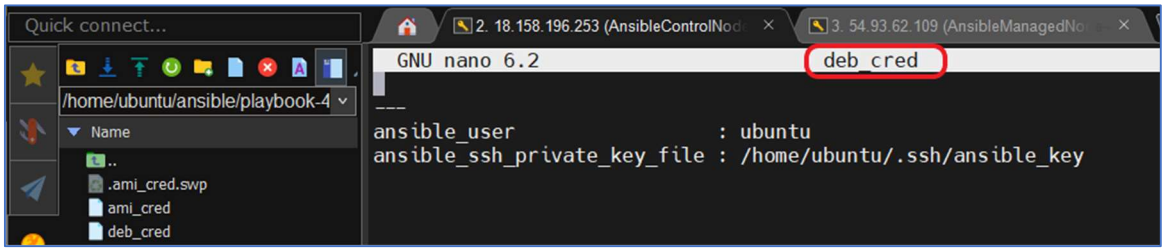
- Creation files **playbook4.yml, hosts.txt, group_vars/ami_cred, group_vars/deb_cred, ansible.cfg**

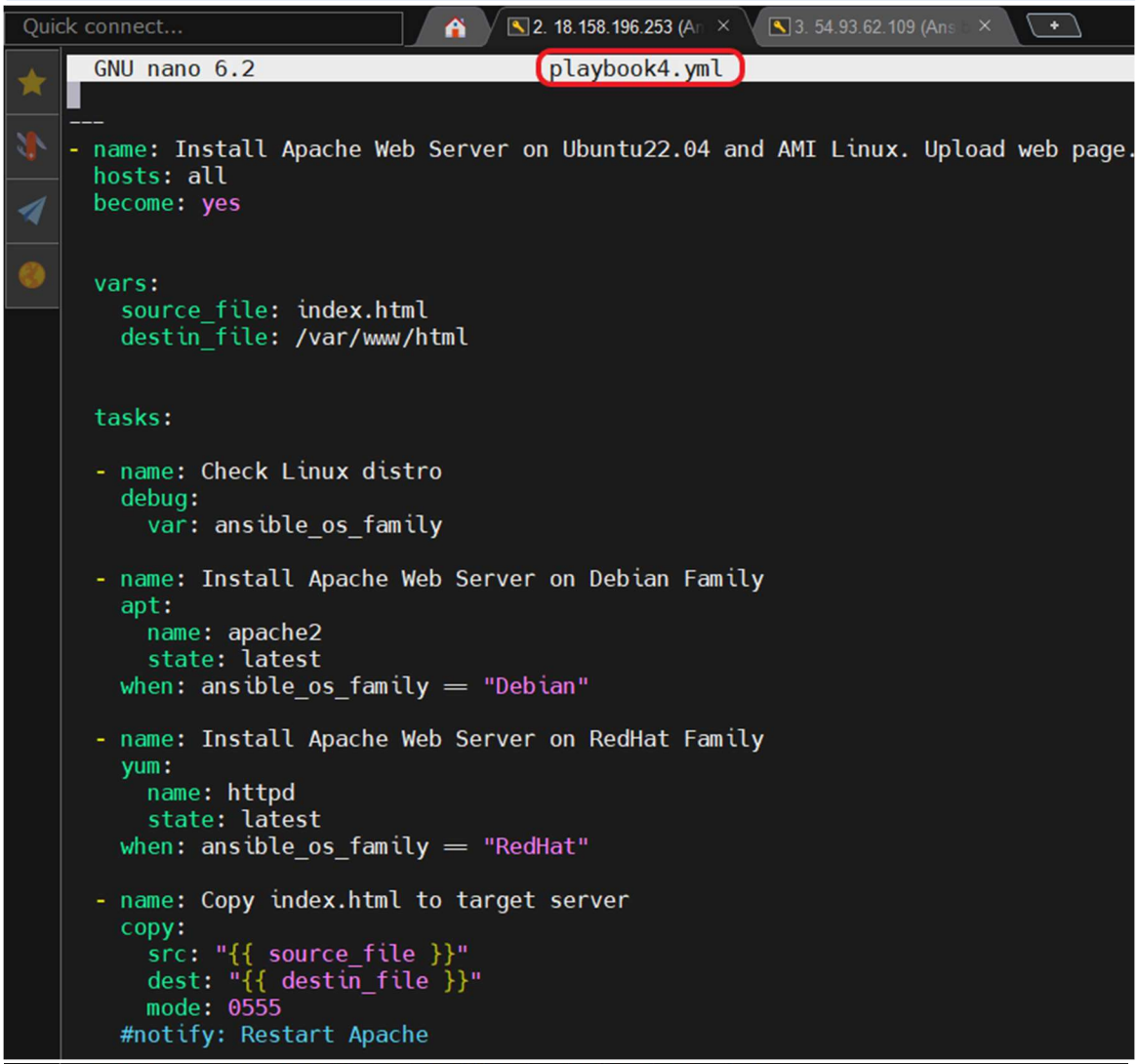




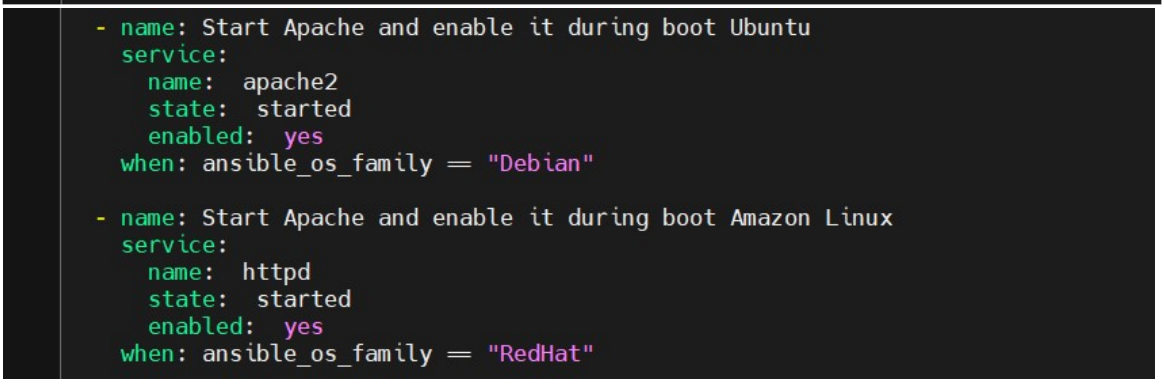



Quick connect...
2. 18.158.196.253 (AnsibleControlNod
3. 54.93.62.109 (AnsibleManagedNo
/home/ubuntu/ansible/playbook-4
Name
..
.ami_cred.swp
ami_cred
deb_cred
GNU nano 6.2
ami_cred
---
ansible_user : ec2-user
ansible_ssh_private_key_file : /home/ubuntu/.ssh/jenkins-frankfurt.pem


Quick connect...
2. 18.158.196.253 (AnsibleControlNod
3. 54.93.62.109 (AnsibleManagedNo
/home/ubuntu/ansible/playbook-4
Name
..
.ami_cred.swp
ami_cred
deb_cred
GNU nano 6.2
deb_cred
---
ansible_user : ubuntu
ansible_ssh_private_key_file : /home/ubuntu/.ssh/ansible_key

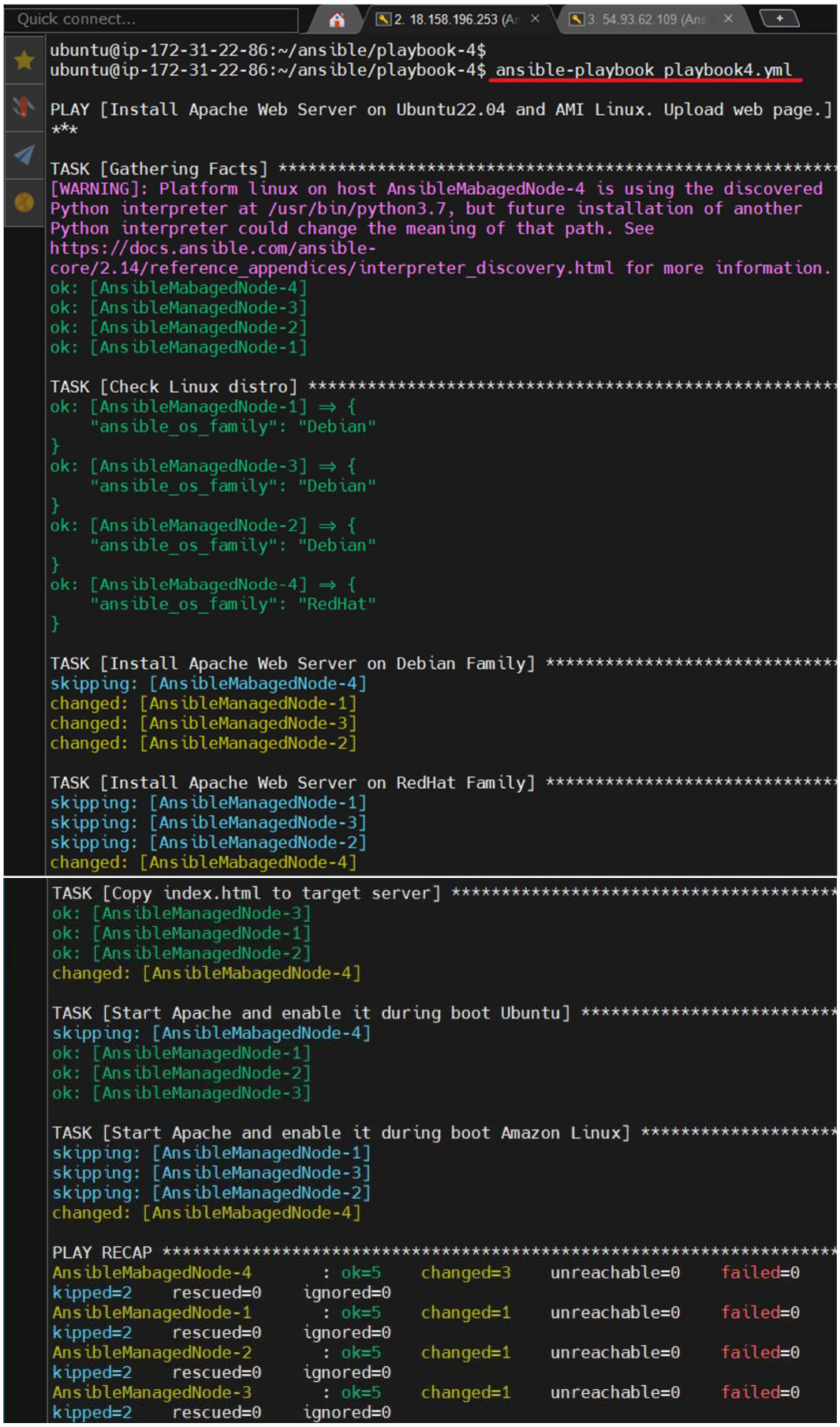

Quick connect...
2. 18.158.196.253 (An
3. 54.93.62.109 (Ans
GNU nano 6.2
playbook4.yml

- name: Install Apache Web Server on Ubuntu22.04 and AMI Linux. Upload web page.
hosts: all
become: yes
vars:
source_file: index.html
destin_file: /var/www/html
tasks:
- name: Check Linux distro
debug:
var: ansible_os_family
- name: Install Apache Web Server on Debian Family
apt:
name: apache2
state: latest
when: ansible_os_family == "Debian"
- name: Install Apache Web Server on RedHat Family
yum:
name: httpd
state: latest
when: ansible_os_family == "RedHat"
- name: Copy index.html to target server
copy:
src: "{{ source_file }}"
dest: "{{ destin_file }}"
mode: 0555
#notify: Restart Apache


- name: Start Apache and enable it during boot Ubuntu
service:
name: apache2
state: started
enabled: yes
when: ansible_os_family == "Debian"
- name: Start Apache and enable it during boot Amazon Linux
service:
name: httpd
state: started
enabled: yes
when: ansible_os_family == "RedHat"

- Run **ansible-playbook** command.

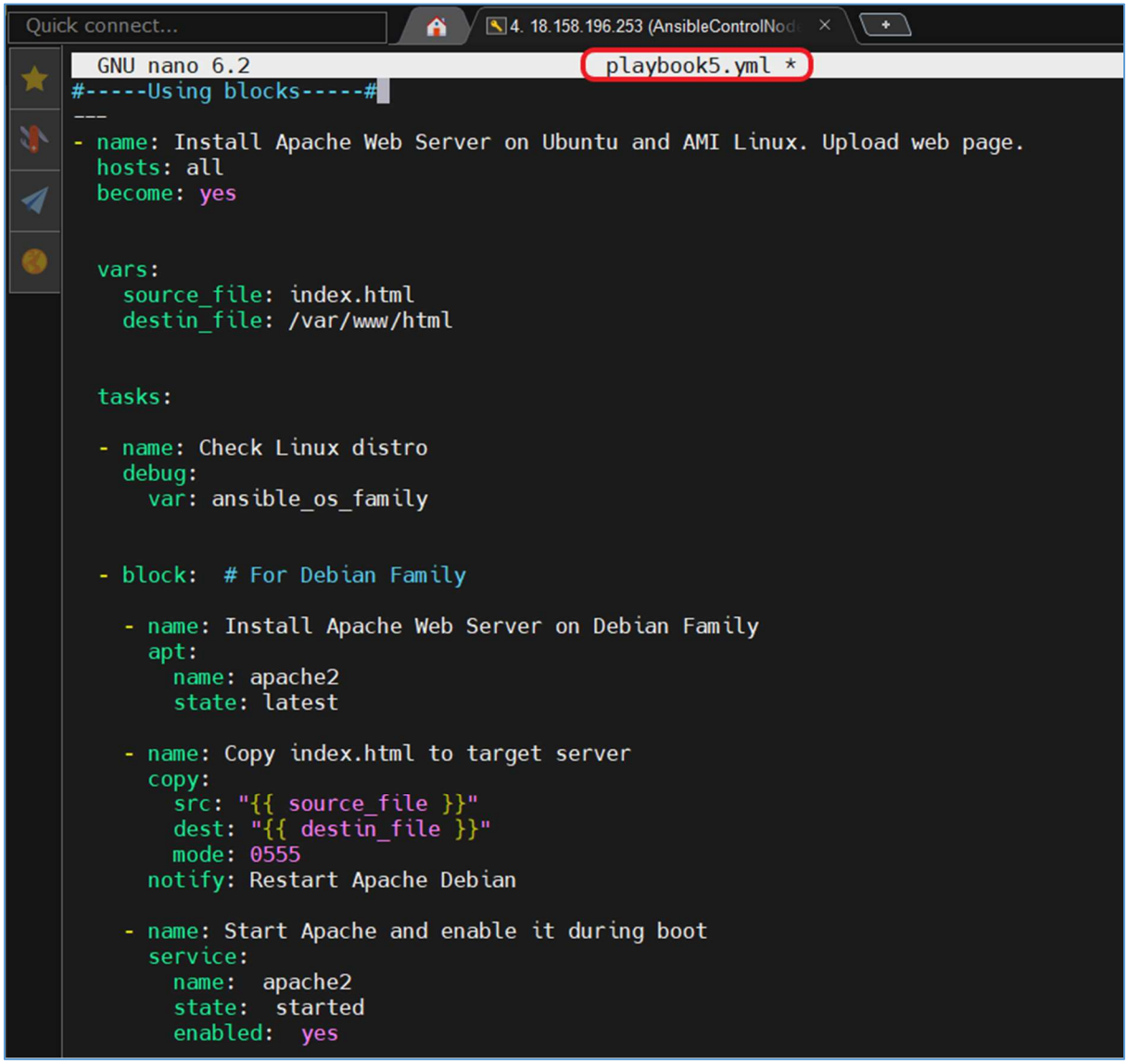
```
$ ansible-playbook playbook4.yml
```

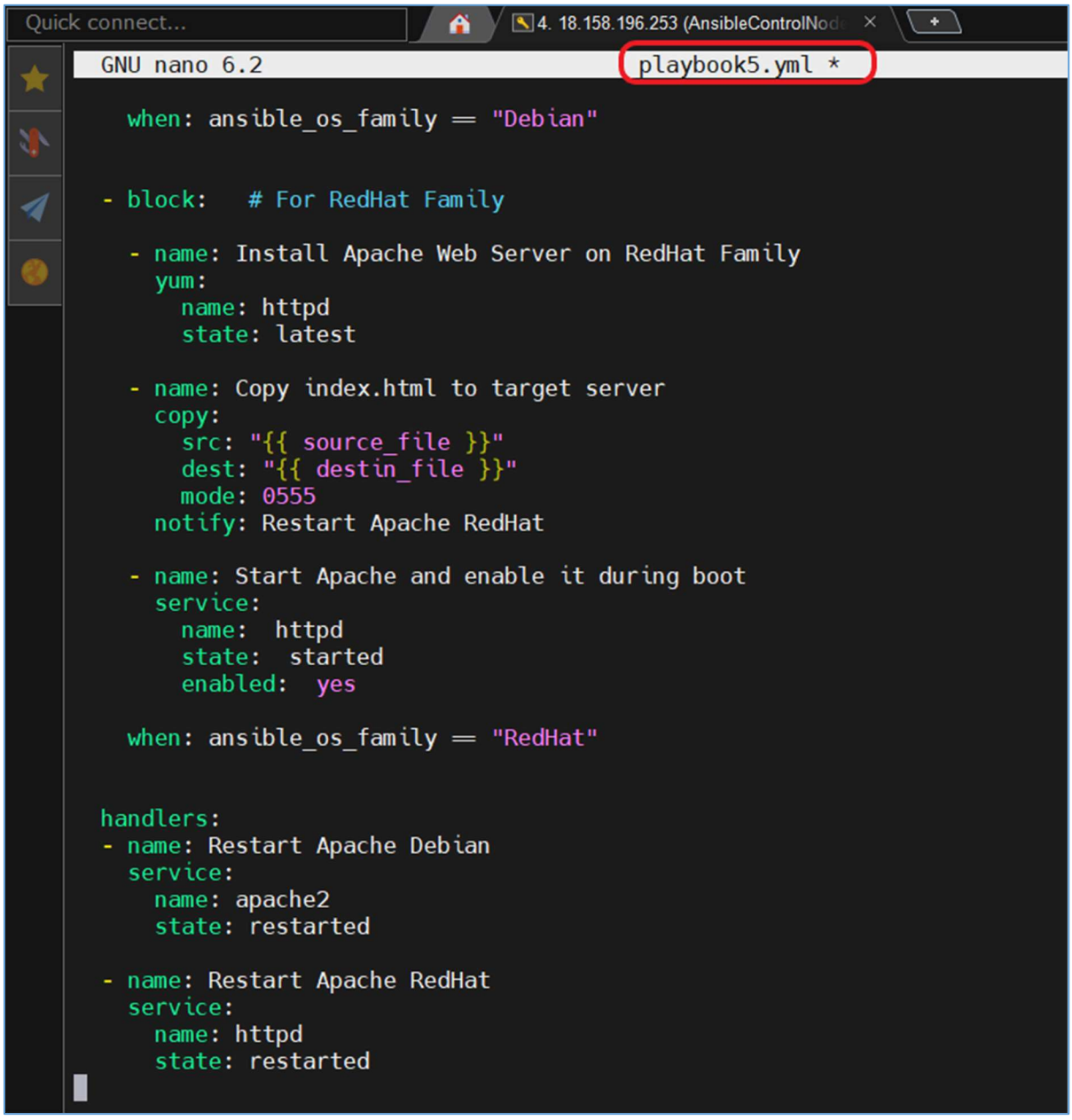


13. My fifth **Ansible** playbook.

Task: Install Apache Web Server on all servers, owned by your organization. Also needed to start Apache Web Server and enable it during boot. Also needed to change default index.html. Servers are on different Linux-based OS(Amazon Linux and Ubuntu).

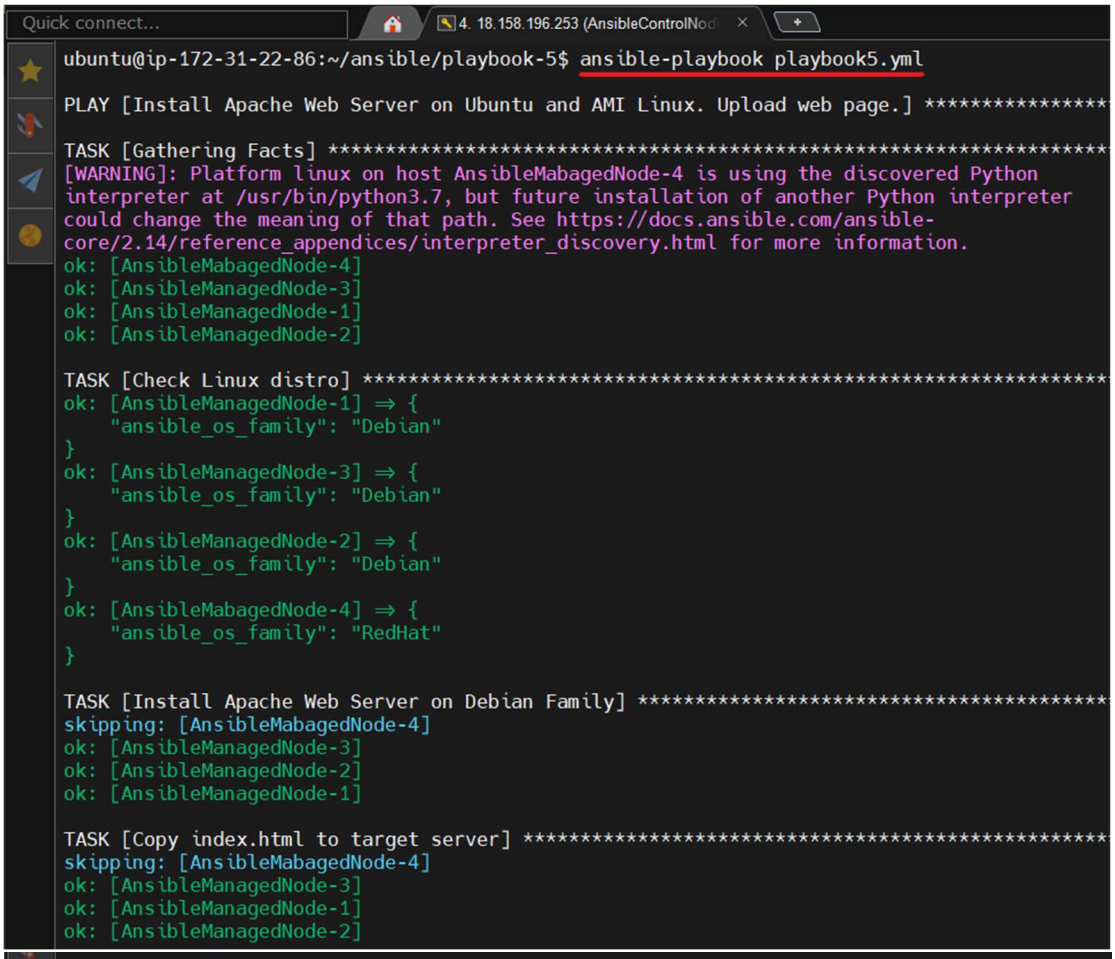
- Creation file **playbook5.yml** with using blocks parametr **(** files **hosts.txt, group_vars/ami_cred, group_vars/deb_cred, ansible.cfg** are used from the previous task)

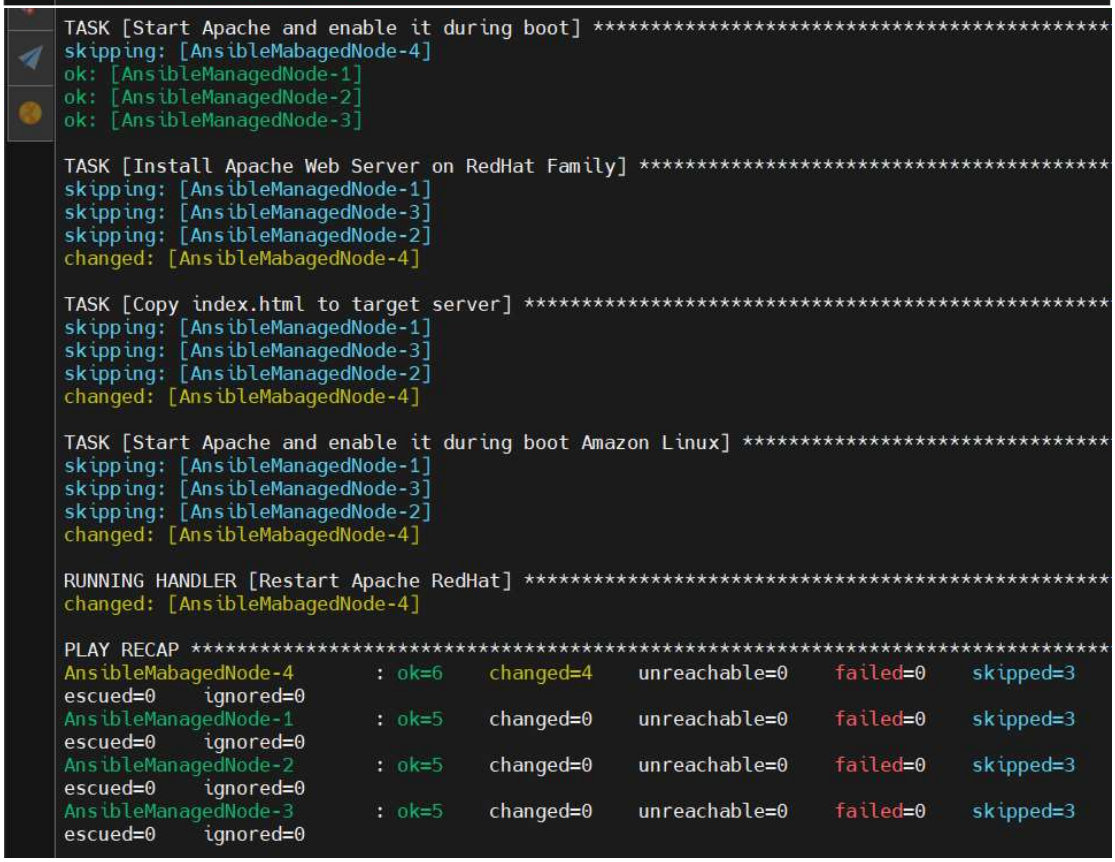



Quick connect...
4. 18.158.196.253 (AnsibleControlNod
GNU nano 6.2
playbook5.yml *
when: ansible_os_family == "Debian"
- block: # For RedHat Family
- name: Install Apache Web Server on RedHat Family
yum:
name: httpd
state: latest
- name: Copy index.html to target server
copy:
src: "{{ source_file }}"
dest: "{{ destin_file }}"
mode: 0555
notify: Restart Apache RedHat
- name: Start Apache and enable it during boot
service:
name: httpd
state: started
enabled: yes
when: ansible_os_family == "RedHat"
handlers:
- name: Restart Apache Debian
service:
name: apache2
state: restarted
- name: Restart Apache RedHat
service:
name: httpd
state: restarted

- Run **ansible-playbook** command.

```
$ ansible-playbook playbook5.yml
```

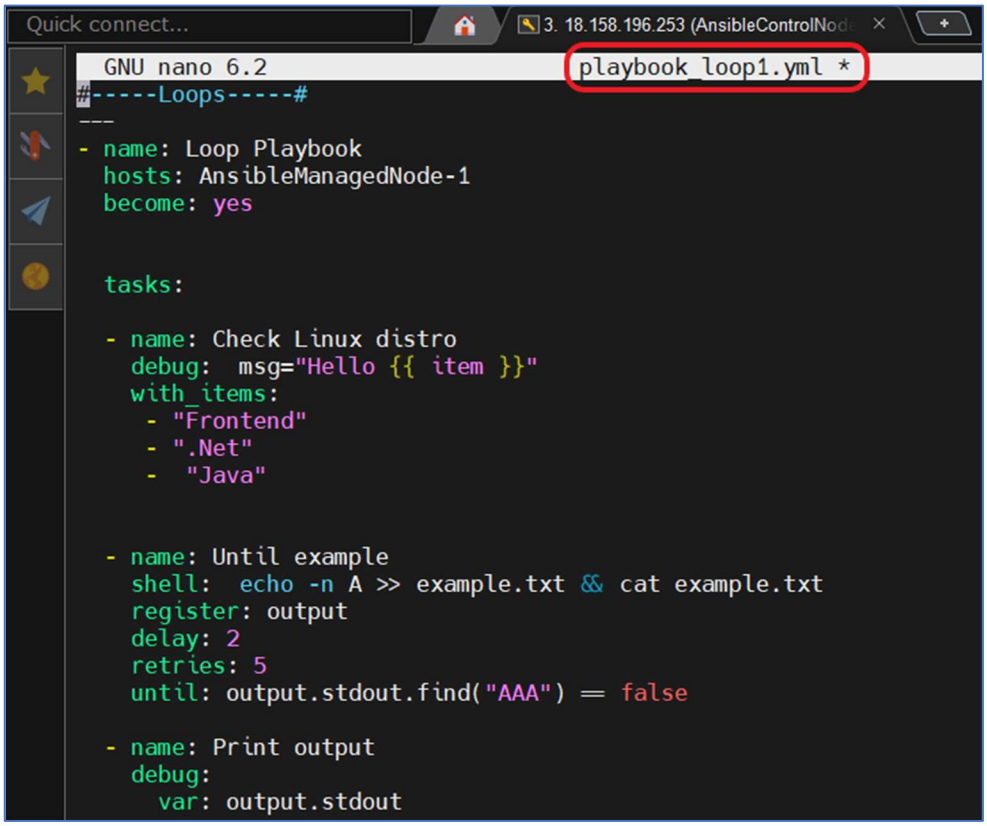




14. My sixth **Ansible** playbook. Loops.

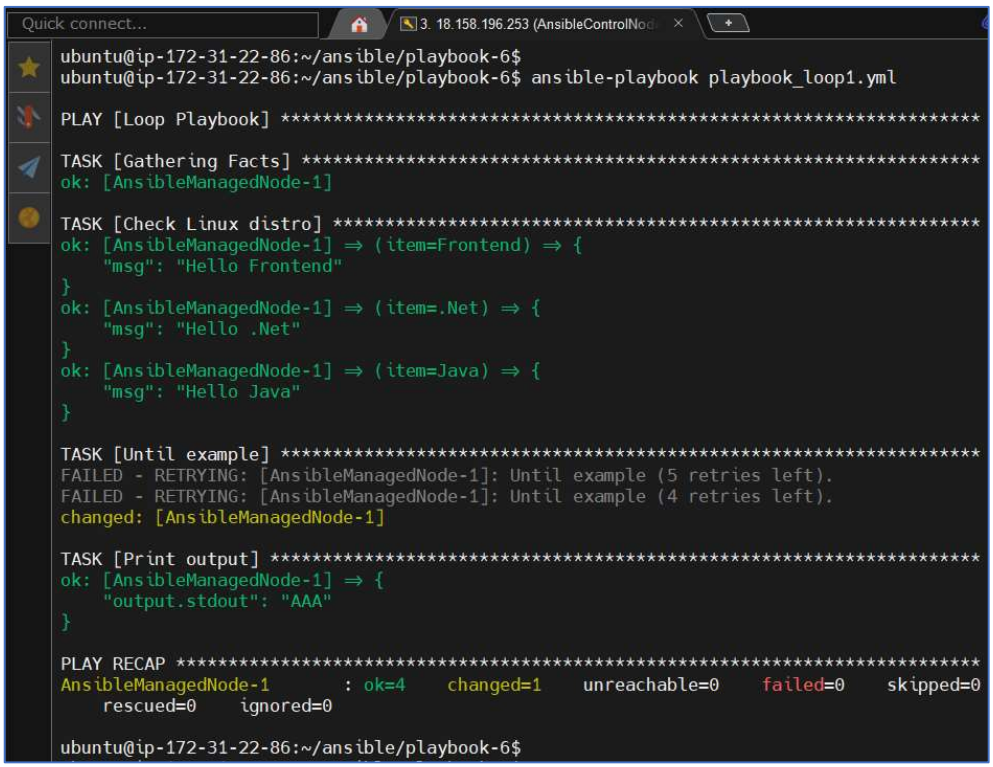
Task: Make some actions on remote server, results should be viewed by output console.

- Creation file **playbook_loop1.yml**



- Run **ansible-playbook** command.

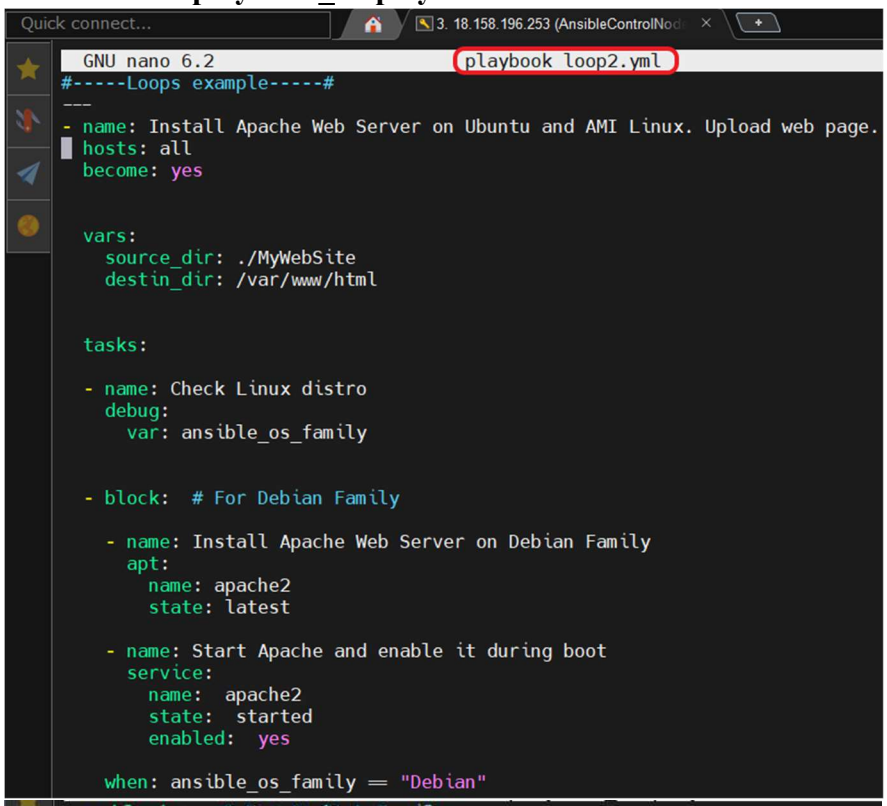
```
$ ansible-playbook playbook_loop1.yml
```

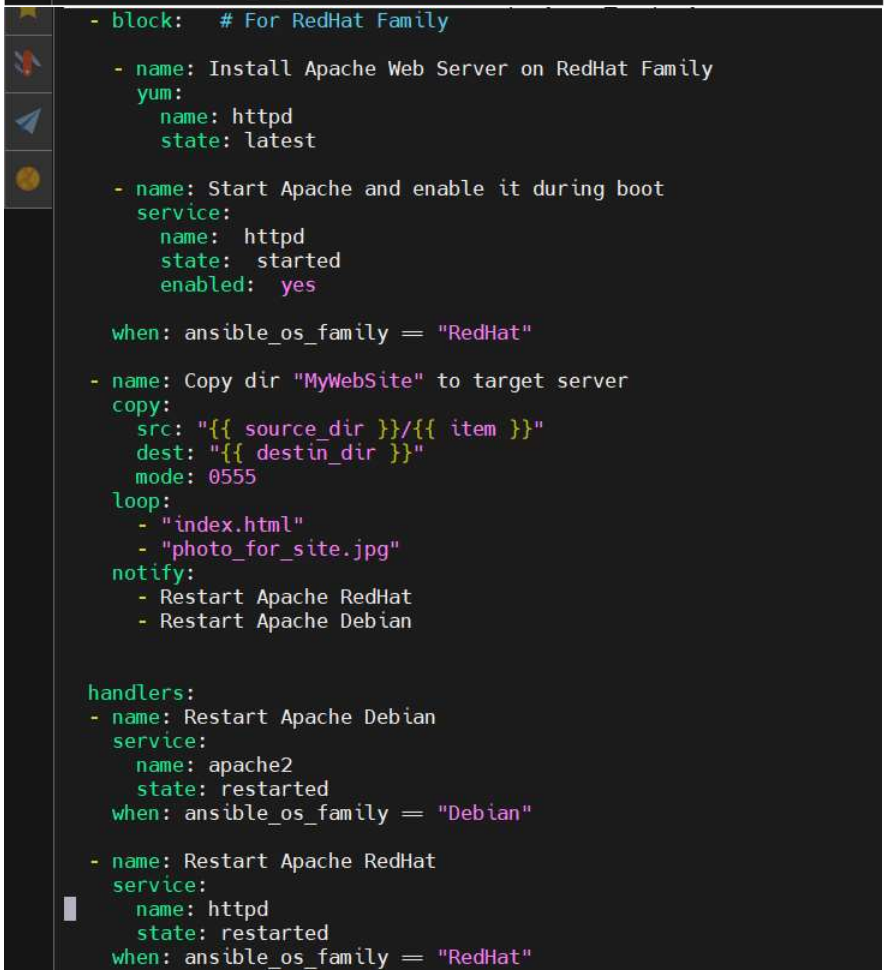


15. My seventh **Ansible** playbook. Loops2.

Task: Copy WebPage (some files) to remote server using loop.

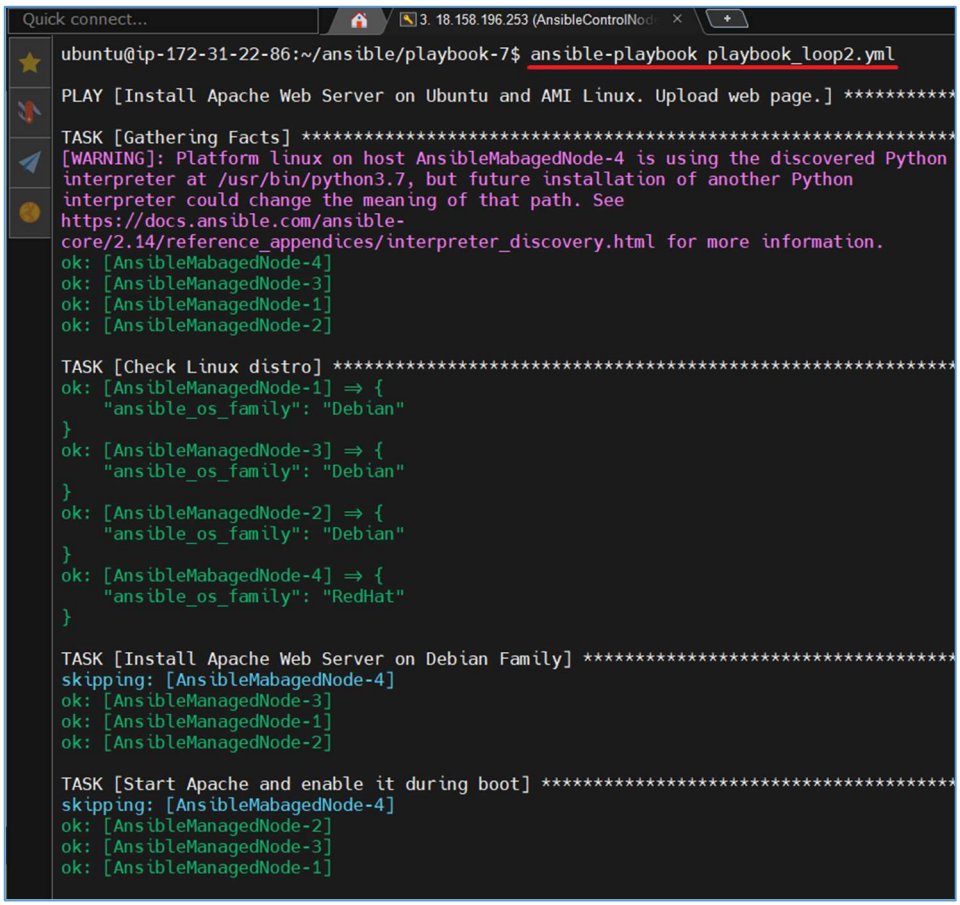
- Creation file **playbook_loop2.yml**

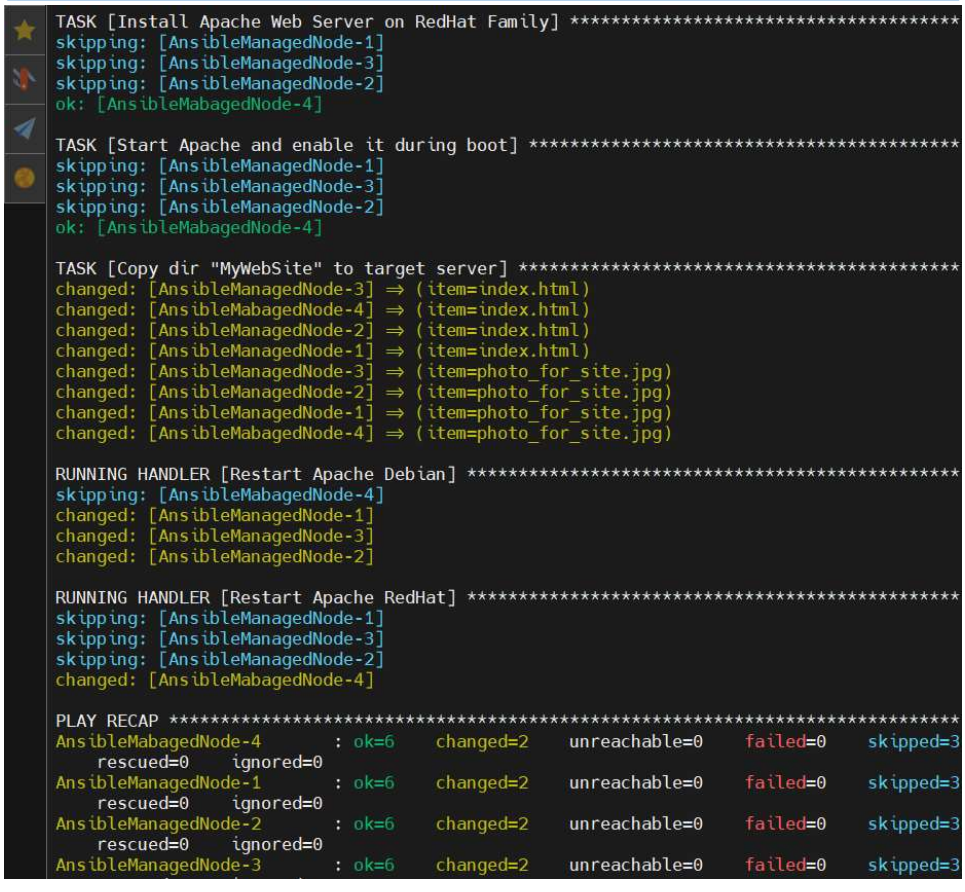




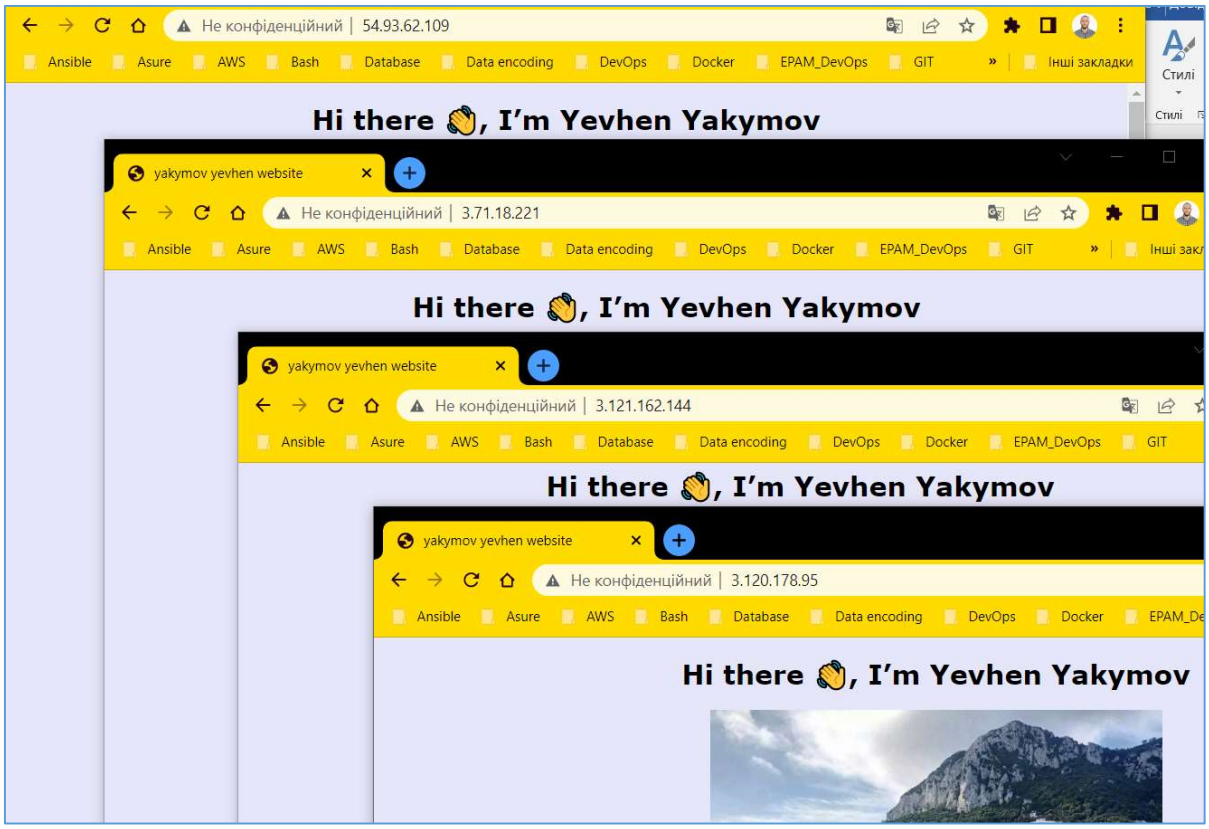
- Run **ansible-playbook** command.

```
$ ansible-playbook playbook_loop2.yml
```





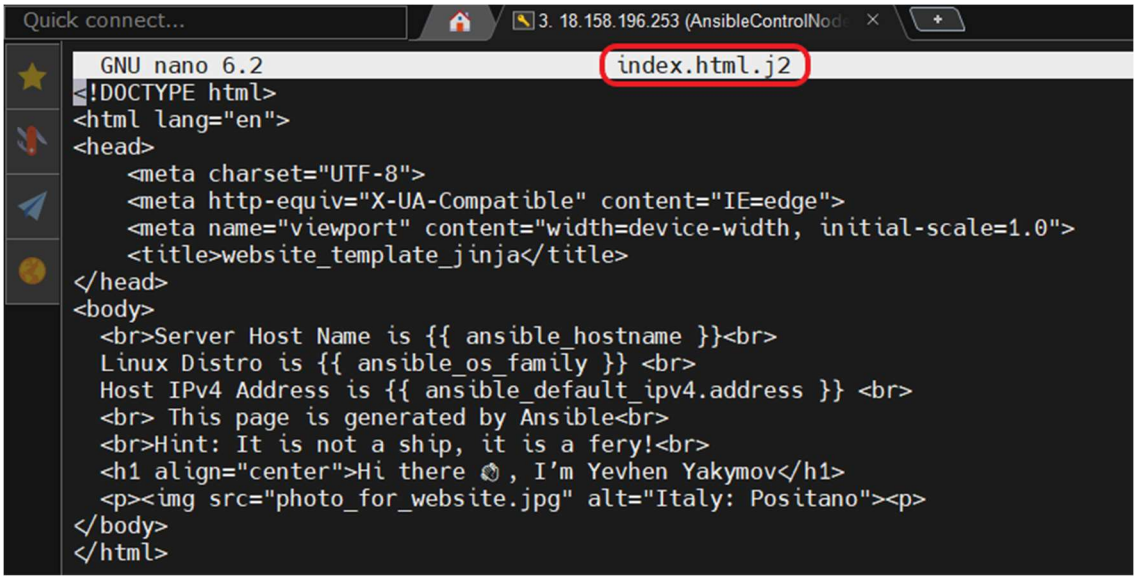
- Checking the availability of the **index.html** page on all Ansible Managed Node's.



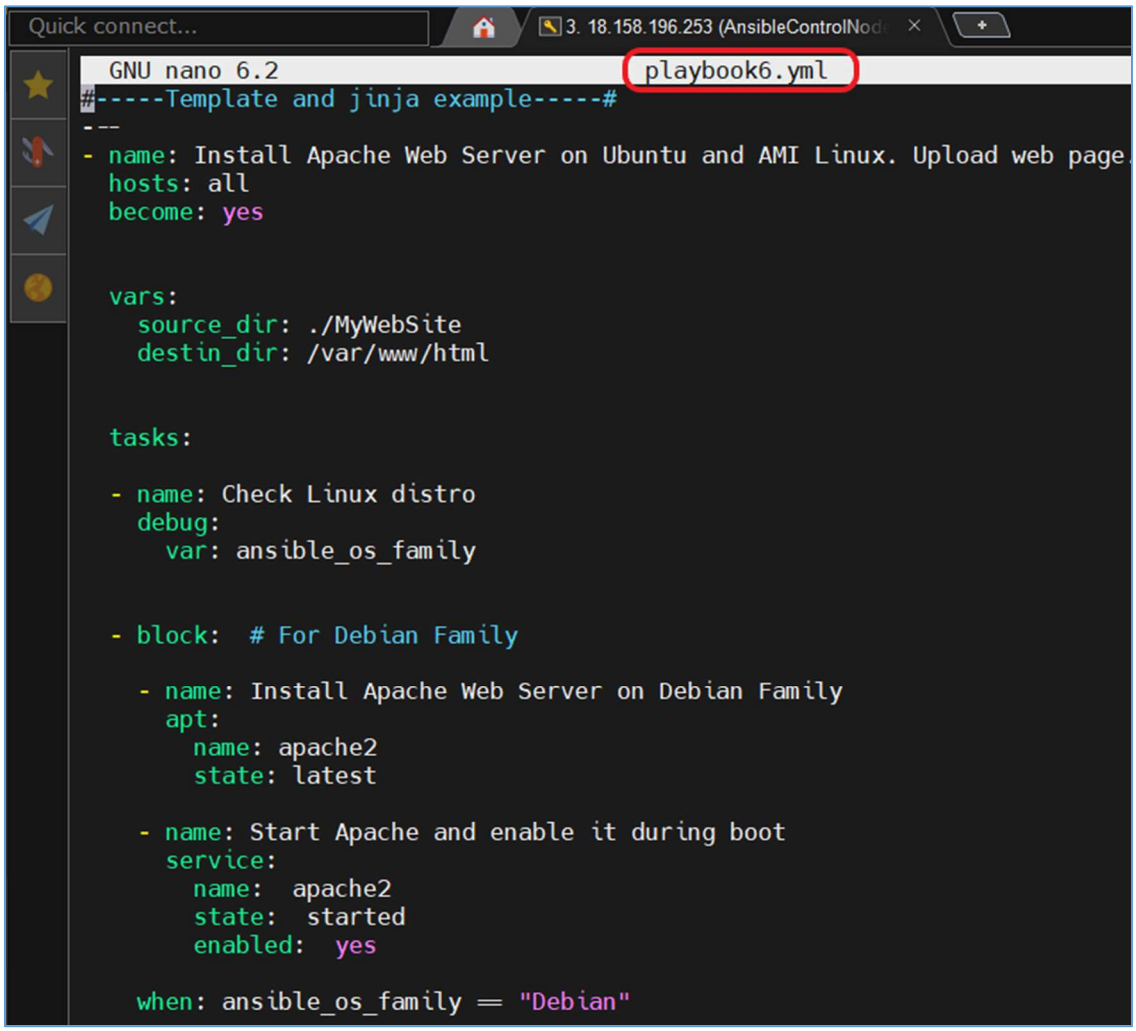
16. My eight **Ansible** playbook. Templates and Jinja.

Task: Customize WebPage on remote servers using template and jinja.

- Creation file **index.html.j2**



- Creation file **playbook6.yml**

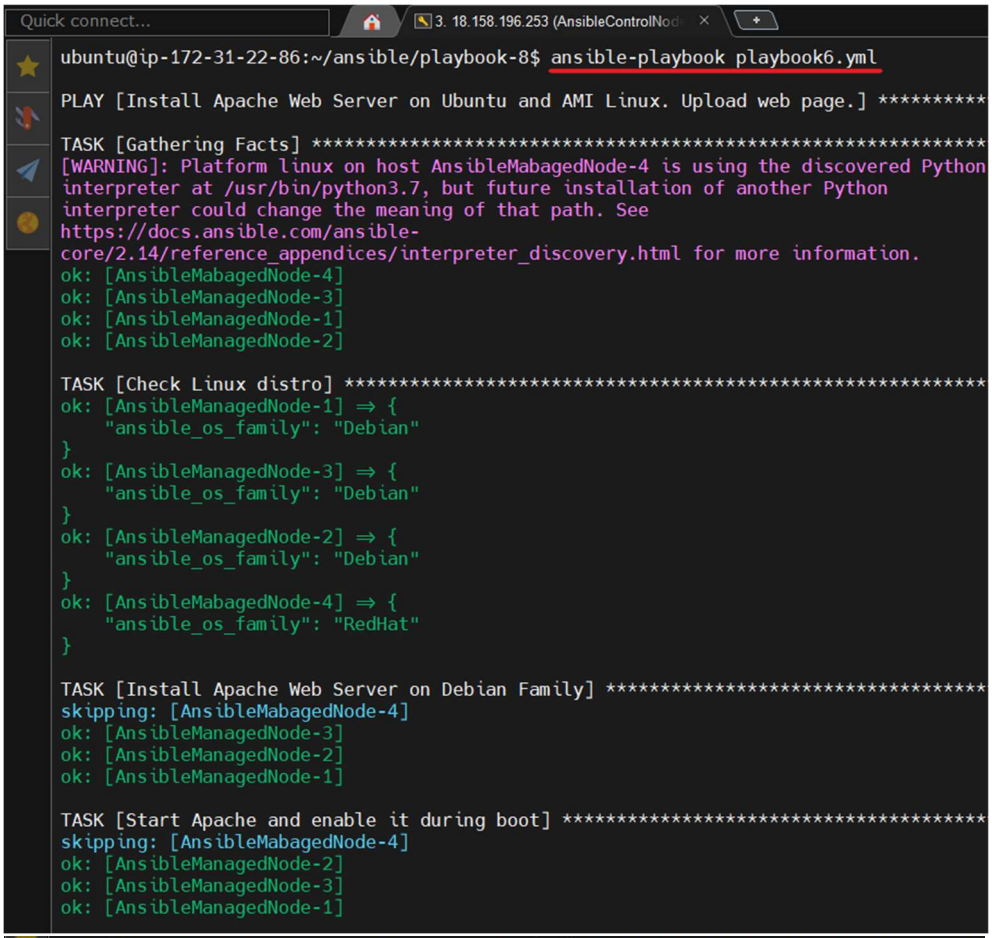


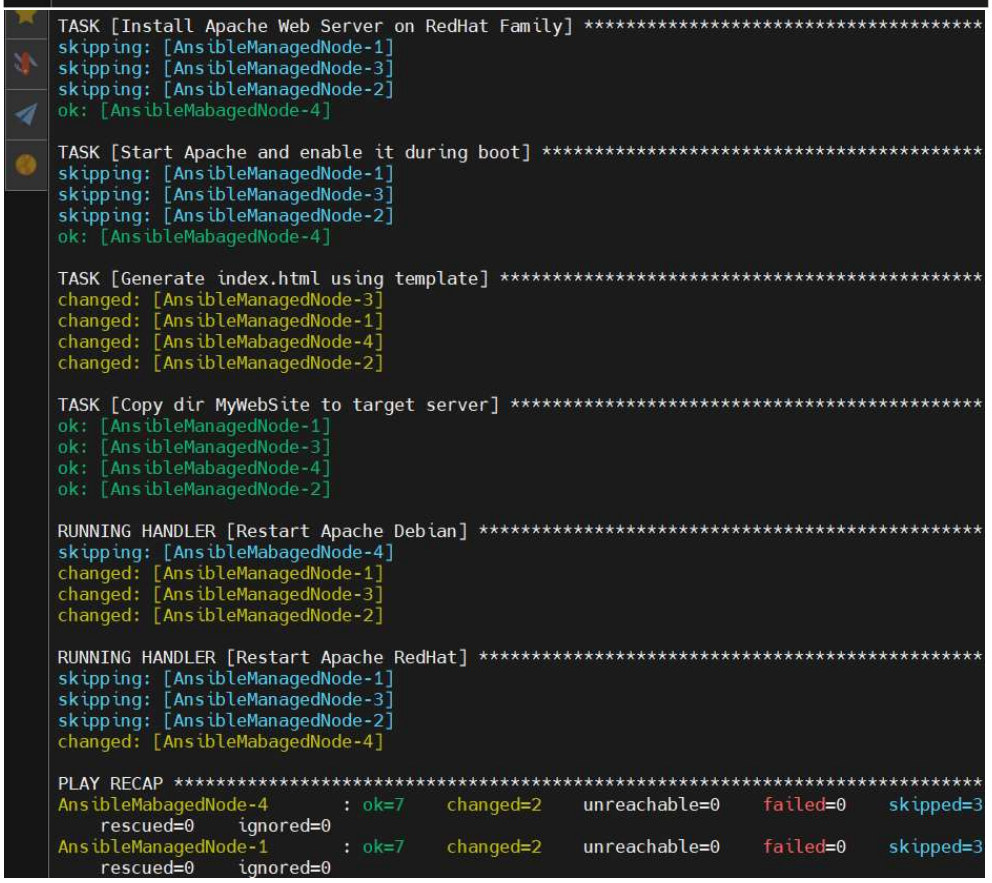
```yaml
- block:   # For RedHat Family

  - name: Install Apache Web Server on RedHat Family
    yum:
      name: httpd
      state: latest

  - name: Start Apache and enable it during boot
    service:
      name:  httpd
      state:  started
      enabled:  yes

  when: ansible_os_family == "RedHat"

- name: Generate index.html using template
  template:
    src: "{{ source_dir }}/index.html.j2"
    dest: "{{ destin_dir }}/index.html"
    mode: 0555
  notify:
    - Restart Apache RedHat
    - Restart Apache Debian

- name: Copy dir MyWebSite to target server
  copy:
    src: "{{ source_dir }}/photo_for_site.jpg"
    dest: "{{ destin_dir }}"
    mode: 0555
  notify:
    - Restart Apache RedHat
    - Restart Apache Debian
```

```yaml
handlers:
- name: Restart Apache Debian
  service:
    name: apache2
    state: restarted
  when: ansible_os_family == "Debian"

- name: Restart Apache RedHat
  service:
    name: httpd
    state: restarted
  when: ansible_os_family == "RedHat"
```

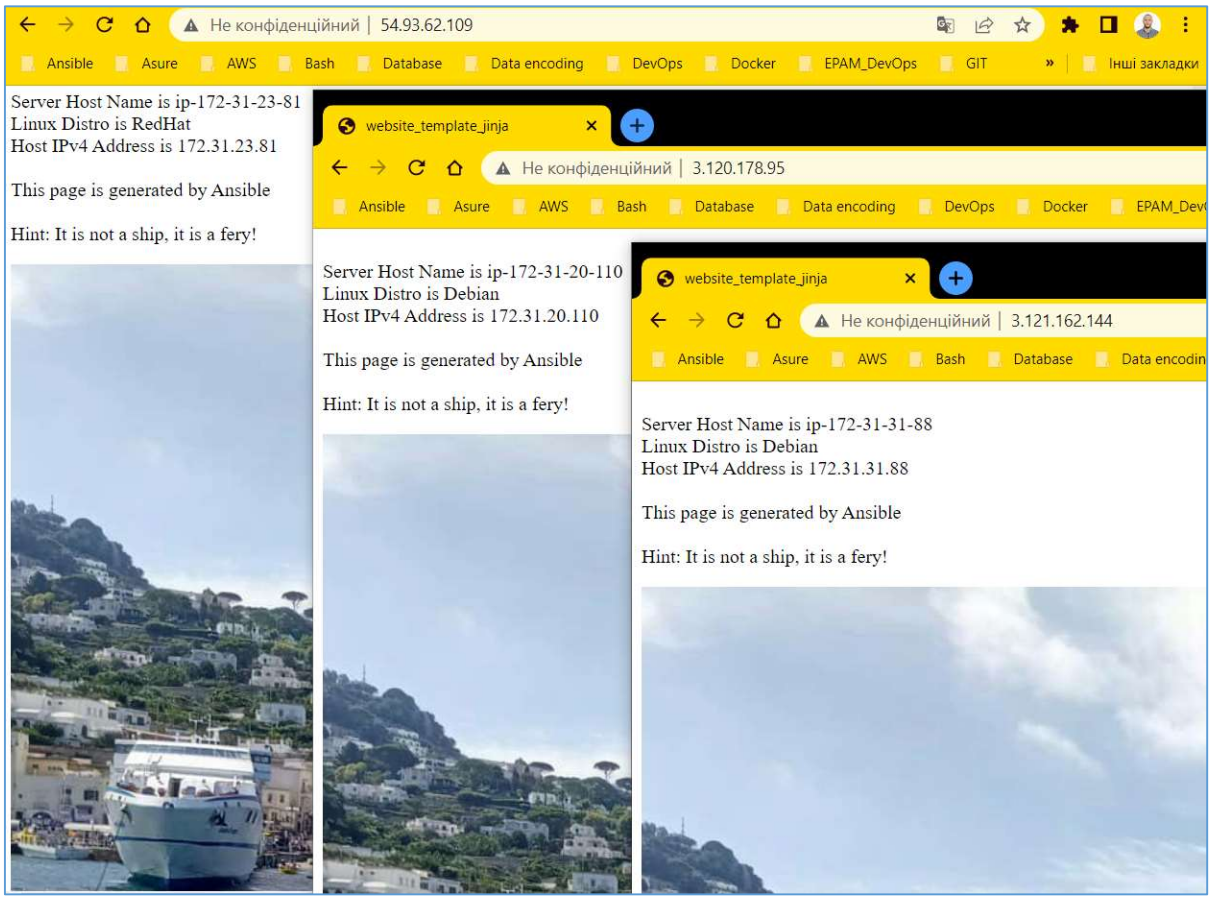
- Run **ansible-playbook** command.

```
$ ansible-playbook playbook6.yml
```





- Checking the availability of the **index.html** page on all Ansible Managed Node's.

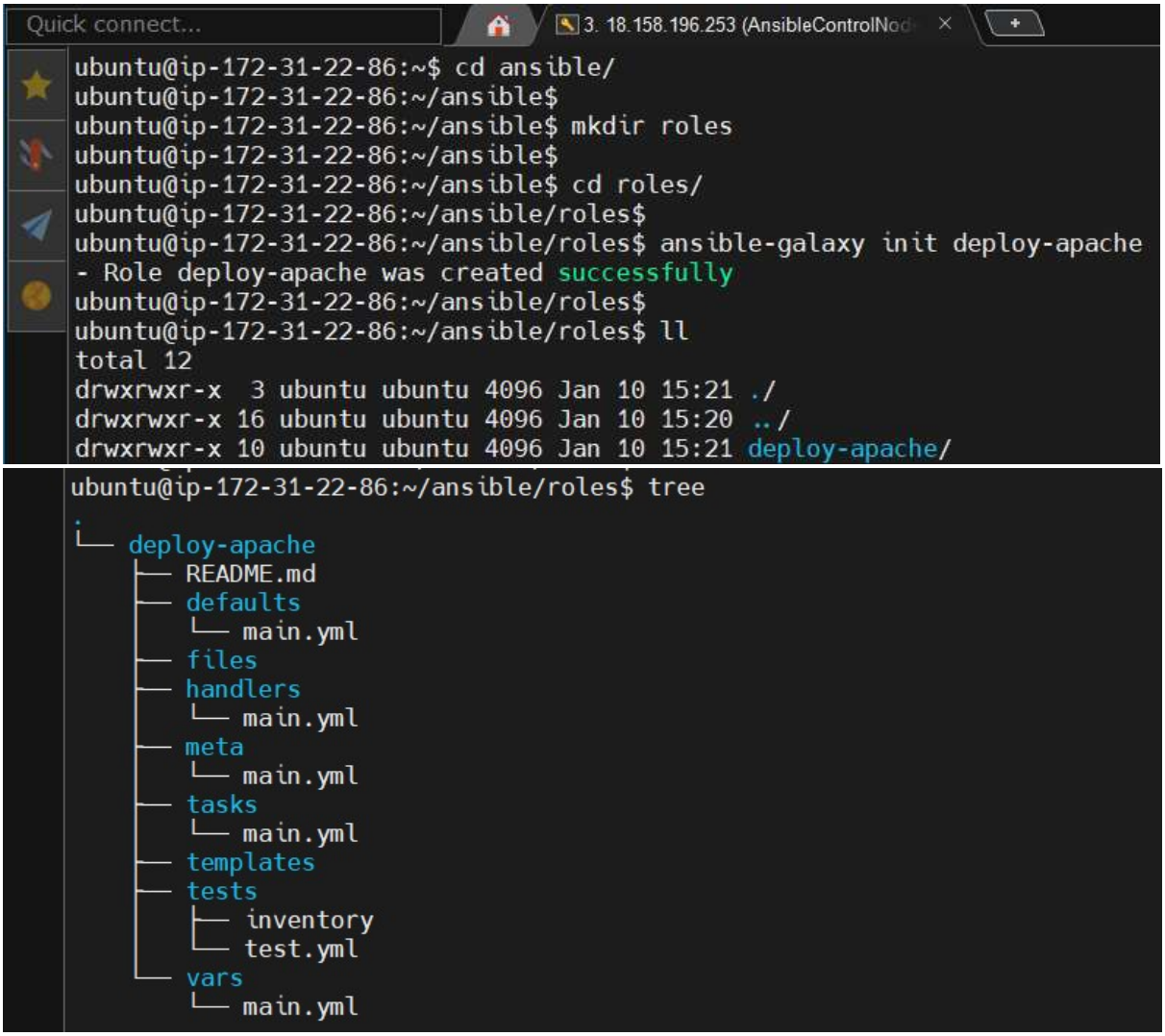


17. **Ansible** Roles.

Task: modifying playbook_loop2.yml used ansible roles.

- Creation **roles** directory and run **ansible** command

```
$ ansible-galaxy init depoloy-apache
```

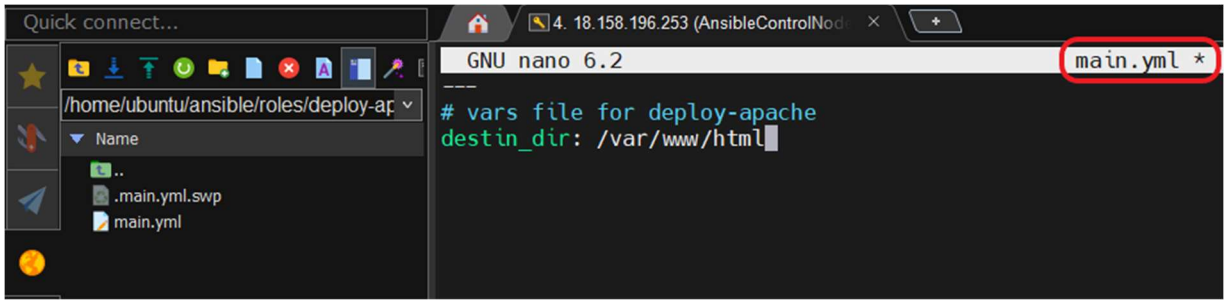


We have got the clean directory structure with the **ansible-galaxy** command. Each directory must contain a **main.yml** file, which contains the relevant content.

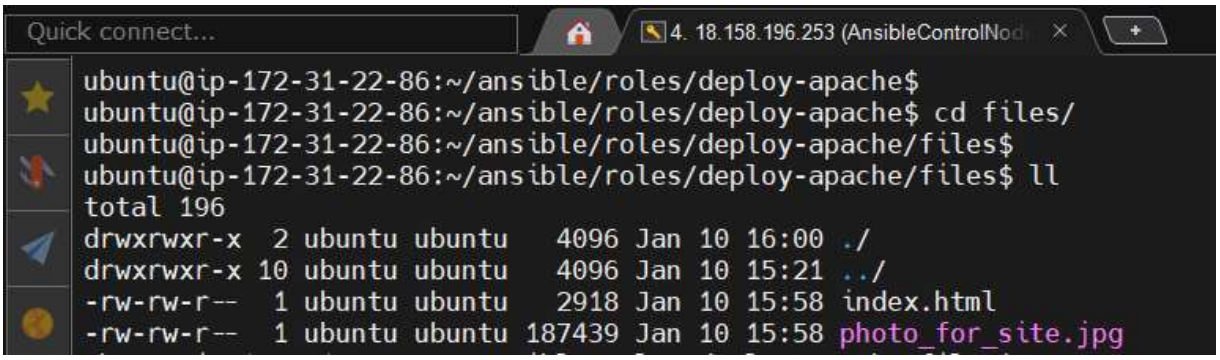
Where :

tasks – contains the main list of tasks to be executed by the role.
handlers – contains handlers, which may be used by this role or even anywhere outside this tole.
defaults – default variables for the role.
vars – other variables for the role. Var has the higher priority than defaults.
files – contains files required to transfer or deploy to the target machines via this role.
templates – contains templates which can be deployed via this role.
meta – defines some data / information about this role(author, dependency,versions, examples, etc).

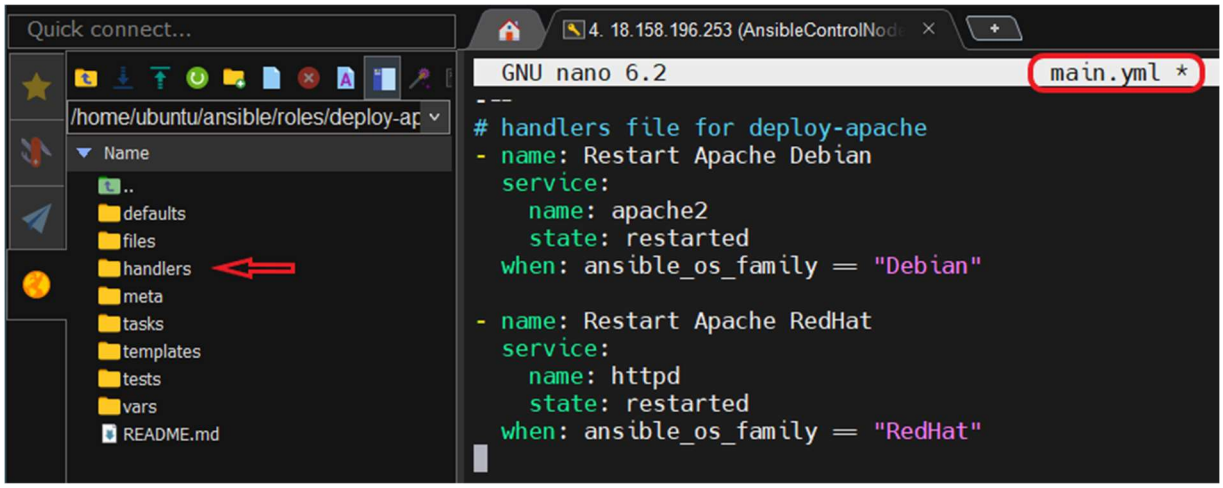
- Writing variables to the **./roles/vars/main.yml** file



- Copy files that must be deployed to the **./roles/files/** directory

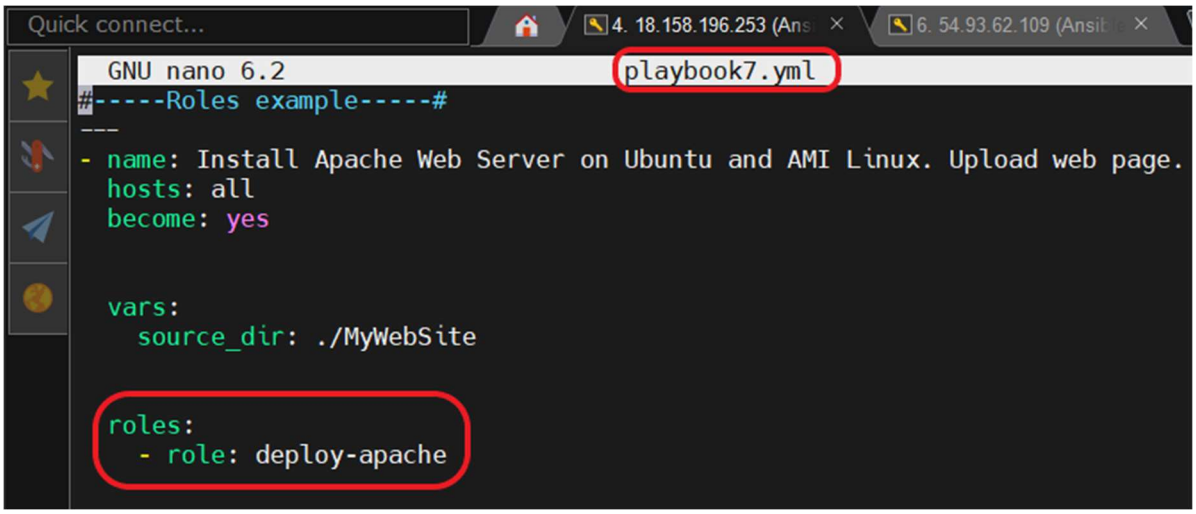


- Writing handlers to the **./roles/handlers/main.yml** file

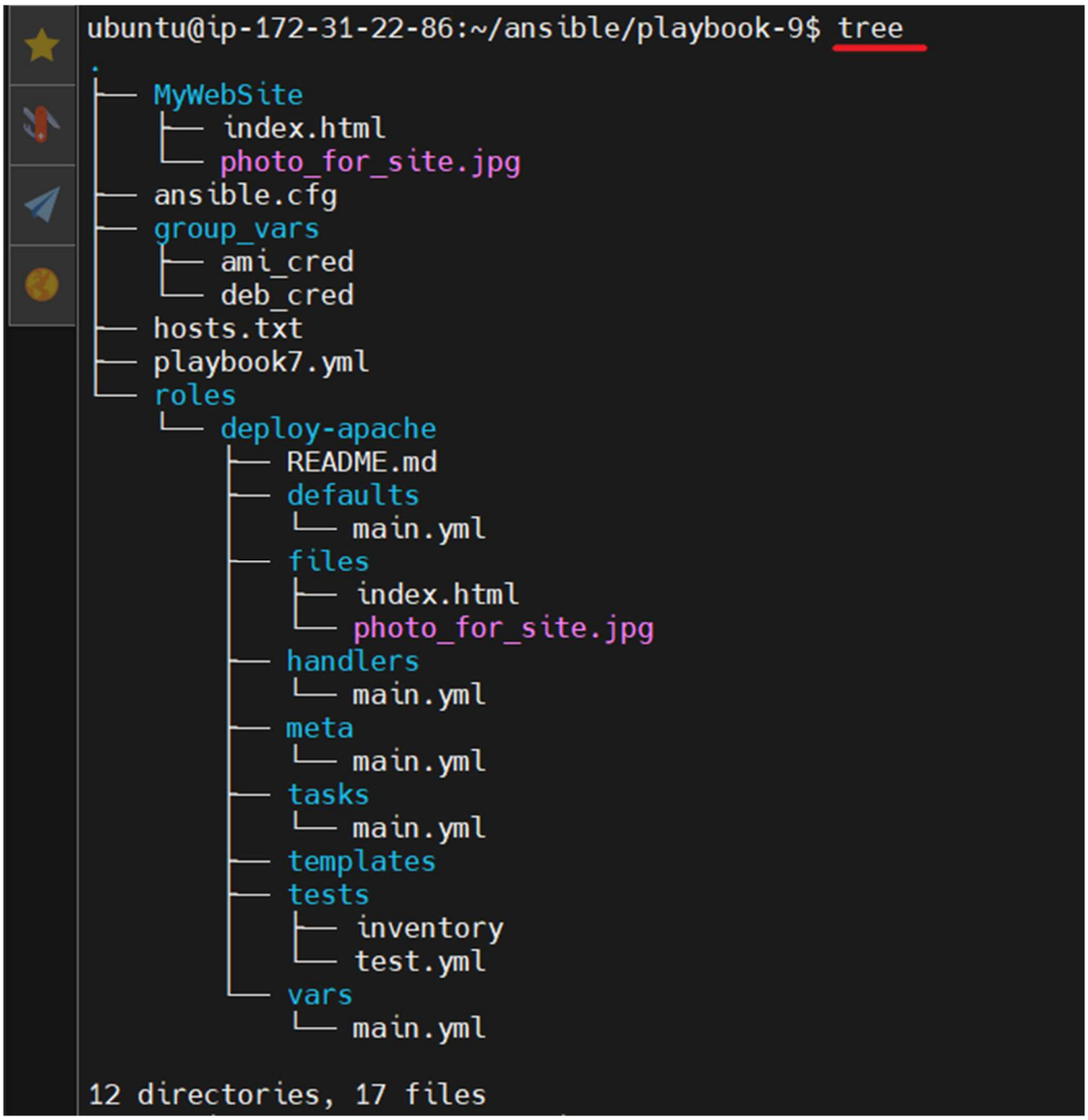


- Writing tasks to the **.roles/tasks/main.yml** file

- Writing **playbook7.yml**

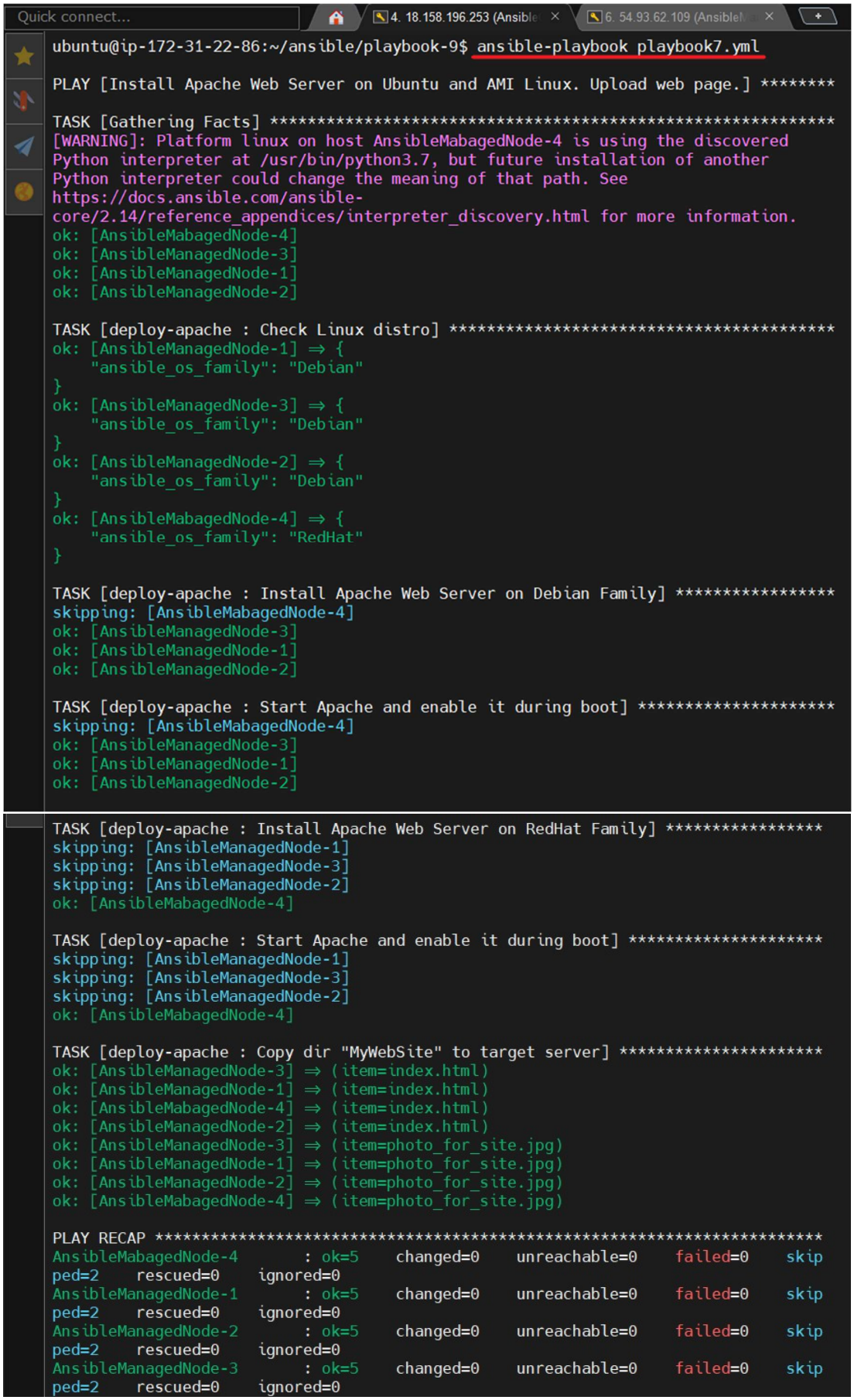


- Directory structure

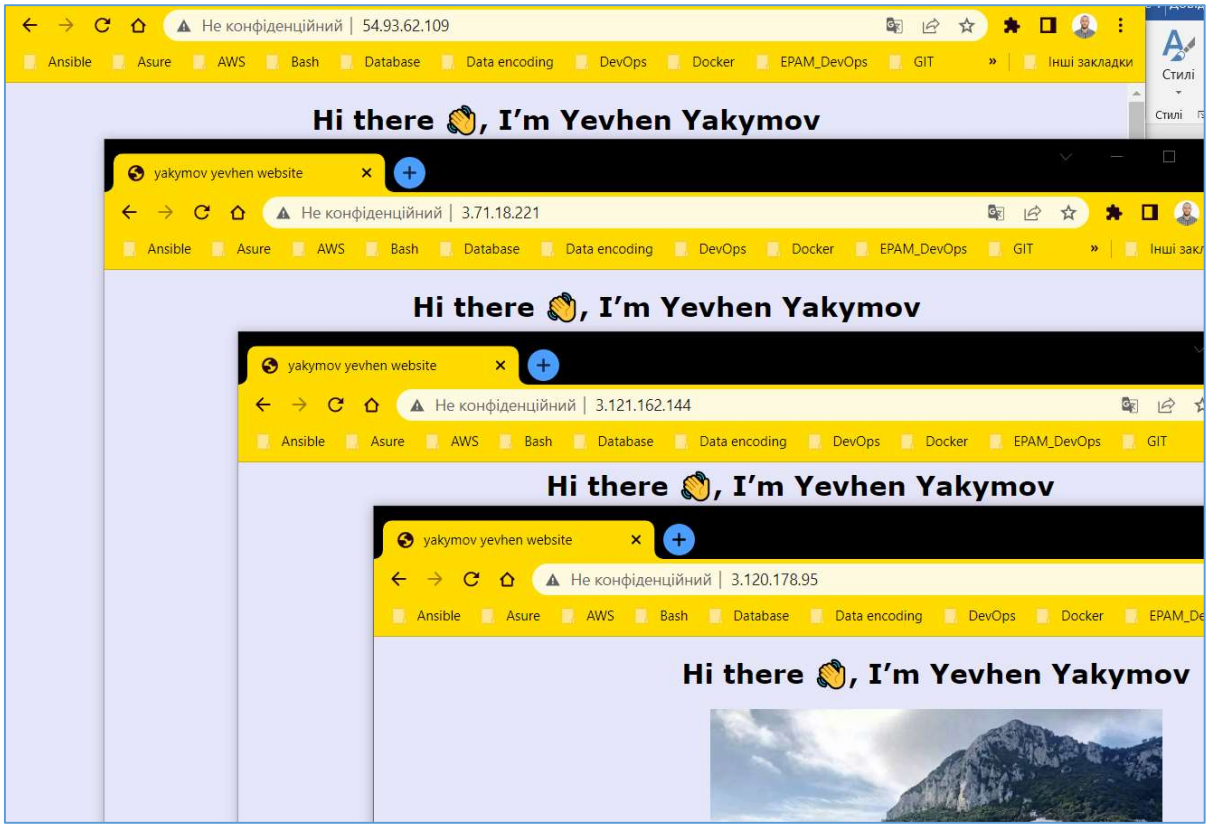


- Run **ansible-playbook** command.

```
$ ansible-playbook playbook7.yml
```



- Checking the availability of the **index.html** page on all Ansible Managed Node's.



18. **Ansible**. Troubleshooting.

The most common strategies for debugging Ansible playbooks are using the modules given bellow:

- **Debug** and **Register**

  These two are the modules available in Ansible. For debbuging purpose, we need to use the two modules judiciously.

- **Verbosity**

  With the Ansible command, one can provide the verbosity level. You can run the commands with verbosity level one (-v), two (-vv) or three (-vvv)

- **--start-at-task and step mode**

  When you are testing new plays or debugging playbooks, you may need to run the same play multiple times. To make this more efficient, Ansible offers two alternaative ways to execute a playbook: **start at task** and **step mode.**

  To start executing your playbook at a particular task (usually the task that failed on the previous run), use **--start-at-task** option:

```
$ ansible-playbook playbook_name.yml --start-at-task "Task_name"
```

  To known list tasks of the current playbook, use **--list-tasks** option:

```
$ ansible-playbook playbook_name.yml --list-tasks
```

```
ubuntu@ip-172-31-22-86:~/ansible/playbook-9$ ansible-playbook playbook7.yml --list-tasks

playbook: playbook7.yml

  play #1 (all): Install Apache Web Server on Ubuntu and AMI Linux. Upload web page.   T
AGS: []
    tasks:
      deploy-apache : Check Linux distro        TAGS: []
      deploy-apache : Install Apache Web Server on Debian Family        TAGS: []
      deploy-apache : Start Apache and enable it during boot    TAGS: []
      deploy-apache : Install Apache Web Server on RedHat Family        TAGS: []
      deploy-apache : Start Apache and enable it during boot    TAGS: []
      deploy-apache : Copy dir "MyWebSite" to target server     TAGS: []
ubuntu@ip-172-31-22-86:~/ansible/playbook-9$
```

  Very usefull approach to use in playbooks and roles **tag:**

```
tag:
  -  nginx
```

  To execute a playbook interactively, use **--start-at-task** option:

```
$ ansible-playbook playbook_name.yml --step
```

ANSIBLE. Troubleshooting -- Example

```
- name: Print the gateway for each host when defined
  ansible.builtin.debug:
    msg: System {{ inventory_hostname }} has gateway {{ ansible_default_ipv4.gateway }}
  when: ansible_default_ipv4.gateway is defined

- name: Get uptime information
  ansible.builtin.shell: /usr/bin/uptime
  register: result

- name: Print return information from the previous task
  ansible.builtin.debug:
    var: result
    verbosity: 2

- name: Display all variables/facts known for a host
  ansible.builtin.debug:
    var: hostvars[inventory_hostname]
    verbosity: 4

- name: Prints two lines of messages, but only if there is an environment value set
  ansible.builtin.debug:
    msg:
    - "Provisioning based on YOUR_KEY which is: {{ lookup('env', 'YOUR_KEY') }}"
    - "These servers were built using the password of '{{ password_used }}'. Please retain this for later use."
```

ANSIBLE. Vault

Once you have a strategy for managing and storing vault passwords, you can start encrypting content. You can encrypt two types of content with Ansible Vault: variables and files. Encrypted content always includes the !vault tag, which tells Ansible and YAML that the content needs to be decrypted, and a | character, which allows multi-line strings. Encrypted content created with --vault-id also contains the vault ID label.
This table shows the main differences between encrypted variables and encrypted files.

	Encrypted variables	Encrypted files
How much is encrypted?	Variables within a plaintext file	The entire file
When is it decrypted?	On demand, only when needed	Whenever loaded or referenced
What can be encrypted?	Only variables	Any structured data file

19. **Ansible**. Vault.

Encrypting content with Ansible Vault:

Ansible Vault encrypts variables and files so you can protect sensetive content sush as passwords or keys rather than leaving it visible as plainetext in playbooks or roles.

To use Ansible Vault you need one or more passwords to encrypt and decrypt content. If you store your vault passwords in a third-party tool such as a secret manager, you need a script to access them.

Use the password with the **ansible-vault** command-line tool to create and view encrypted variables, create encrypted files, encrypt existing files, or edit, re-key, or decrypt files. You can then place encrypted content under source control and share it more safely.

Managing vault passwords:

Managing your encrypted content is easier if you develop a strategy for managing your vault passwords. A vault password can be any string you choose. There is no special command to create a vault password. However, you need to keep track of your vault passwords. Each time you encrypt a variable or file with ***Ansible Vault***, you must provide a password. When you use an encrypted variable or file in a command or playbook, you must provide the same password that was used to encrypt it. To develop a strategy for managing vault passwords, start with two questions:

Do you want to encrypt all your content with the same password, or use different passwords for different needs?

Where do you want to store your password or passwords?

Choosing between a single password and mulpiple passwords:

If you have a small team or few sensitive values, you can use a single password for everything you encrypt with Ansible Vault. Store your vault password securely in a file or a secret manager as described below.

If you have a larger team or many sensitive values, you can use multiple passwords. For example, you can use different passwords for *different users* or *different levels* of access. Depending on your needs, you might want a different password for each encrypted *file*, for each *directory*, or for each *environment*.

For example, you might have a playbook that includes two vars files, one for the dev environment and one for the production environment, encrypted with two different passwords. When you run the playbook, select the correct vault password for the environment you are targeting, using a vault ID.

Managing multiple passwords with vault ID's:

If you use multiple vault passwords, you can differentiate one password from another with vault IDs. You use the vault ID in three ways:

- Pass it with **--vault-id** to the ansible-vault command when you create encrypted content
- Include it wherever you store the password for that vault ID (see Storing and accessing vault passwords)
- Pass it with **--vault-id** to the ansible-playbook command when you run a playbook that uses content you encrypted with that vault ID