INVOLVING JENKINS, TERRAFORM, AND ANSIBLE

- **NEW REQUIREMENT:**
  WE NEED TO **UPGRADE THE JENKINS SERVER** TODAY.

- INSTALL A SPECIFIC VERSION FIRST.
- THEN, UPGRADE TO THE LATEST VERSION.
- **NOTE:** SHARE COMPLETE STEPS **WITH SCREENSHOTS** OF THE UPGRADE PROCESS.

- **QUICK QUERY:**
  →WE'VE BEEN DISCUSSING **PATCHING ACTIVITIES,** BUT WHAT EXACTLY IS "PATCHING"?
  →ALSO, WHICH TYPE OF **PATCH** ARE WE APPLYING USING ANSIBLE?

Patching Activities: Patching refers to the process of applying updates to software to fix bugs, improve functionality, or address security vulnerabilities. It's an essential part of maintaining system security and performance.

Types of Patches

- **Binary Patches**: Updating software binaries to a new version.
- **Source Code Patches**: Applying code changes to the source code to fix issues or add new features.

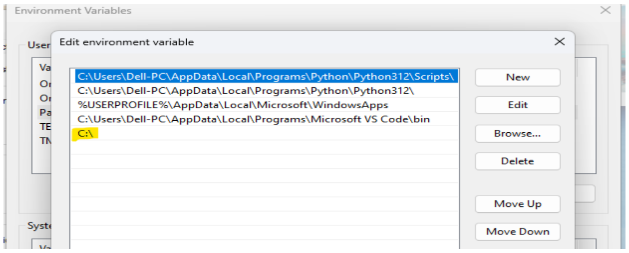
In this case, with Ansible, we are applying a **binary patch** to upgrade Jenkins to the latest version by using the apt module to update the Jenkins package.

>>INSTALL TERRAFORM FROM https://developer.hashicorp.com/terraform/install

>>AFTER DOWNLOAD MOVE IT TO C:\TERRAFORM IN THE WINDOWS MACHINE

>>NOW GO TO SEARCH BAR AND SEARCH FOR EDIT SYSTEM ENVIRONMENT VARIABLES

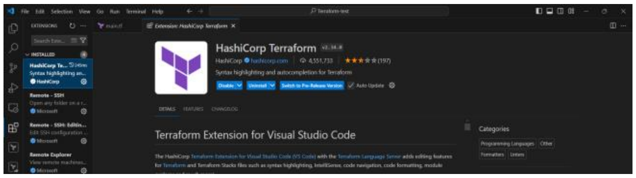
>>ADD THE EVIRONMENT VARIABLE AND SELECT THE PATH AS C:\TERRAFORM



Edit environment variable

```
C:\Users\Dell-PC\AppData\Local\Programs\Python\Python312\Scripts\
C:\Users\Dell-PC\AppData\Local\Programs\Python\Python312\
%USERPROFILE%\AppData\Local\Microsoft\WindowsApps
C:\Users\Dell-PC\AppData\Local\Programs\Microsoft VS Code\bin
C:\
```

>>GO TO VISUAL CODE STUDIO AND ADD EXTENTION HASHI CORP BY INSTALLING IT



HashiCorp Terraform

Syntax highlighting and autocompletion for Terraform

Terraform Extension for Visual Studio Code

The HashiCorp Terraform Extension for Visual Studio Code (VS Code) with the Terraform Language Server adds editing features for Terraform and Terraform Stacks files such as syntax highlighting, IntelliSense, code navigation, code formatting, module

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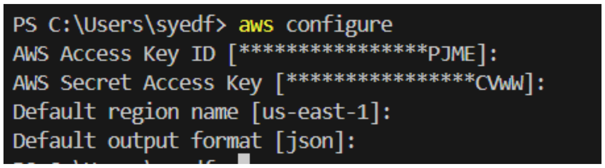
>>OPEN IT IN VISUAL CODE

→DOWNLOAD AWS CLI AND CONFIGURE IT

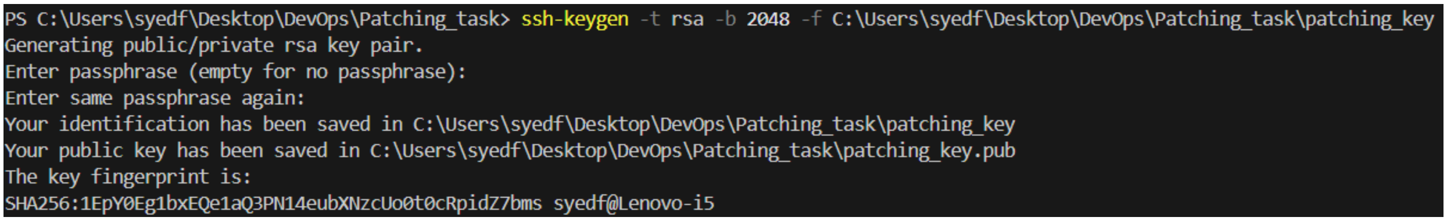


```
PS C:\Users\syedf> aws configure
AWS Access Key ID [****************PJME]:
AWS Secret Access Key [****************CVWW]:
Default region name [us-east-1]:
Default output format [json]:
```

>>CREATE A FOLDER Patching_task

→CREATE A PUBLIC KEY IN CERATED FOLDER ITSELF TO LOGIN TO SERVERS

# ssh-keygen -t rsa -b 2048 -f C:\Users\syedf\Desktop\DevOps\Patching_task\patching_key



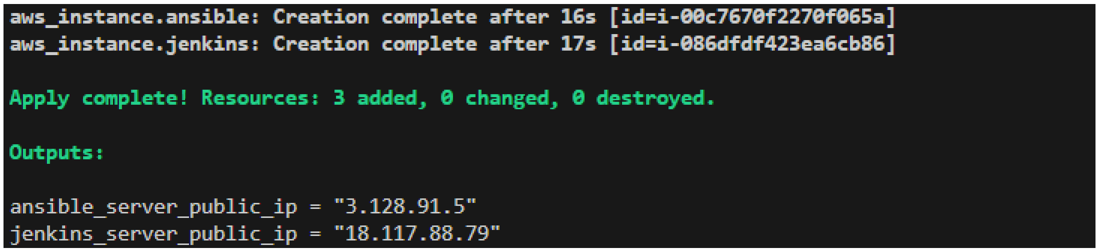
```
PS C:\Users\syedf\Desktop\DevOps\Patching_task> ssh-keygen -t rsa -b 2048 -f C:\Users\syedf\Desktop\DevOps\Patching_task\patching_key
Generating public/private rsa key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in C:\Users\syedf\Desktop\DevOps\Patching_task\patching_key
Your public key has been saved in C:\Users\syedf\Desktop\DevOps\Patching_task\patching_key.pub
The key fingerprint is:
SHA256:1EpY0Eg1bxEQe1aQ3PN14eubXNzcUo0t0cRpidZ7bms syedf@Lenovo-i5
```

>>CERATE A main.tf FILE IN FOLDER AND WRITE A TEMPLATE TO LAUNCH 2 EC2 INSTANCES ONE WOULD BE ANSIBLE SERVER AND OTHER WOULD BE JENKINS SERVER

>FOLLOW THE BELOW TEMPLATE

```
provider "aws" {
  region = "us-east-2"
}

resource "aws_key_pair" "patching" {
  key_name   = "patching"
  public_key = file("C:/Users/syedf/Desktop/DevOps/Patching_task/patching_key.pub")
}

resource "aws_instance" "jenkins" {
  ami                         = "ami-00eb69d236edcfaf8"
  instance_type               = "t2.micro"
  key_name                    = aws_key_pair.patching.key_name
  associate_public_ip_address = true
  tags = {
    Name = "jenkins_server"
  }

}

resource "aws_instance" "ansible" {
  ami                         = "ami-00eb69d236edcfaf8"
  instance_type               = "t2.micro"
  key_name                    = aws_key_pair.patching.key_name
  associate_public_ip_address = true
  tags = {
    Name = "ansible_server"
  }
  user_data = <<-EOF
            #!/bin/bash
            sudo apt-get update
            sudo apt-get install -y ansible
            EOF
}

output "ansible_server_public_ip" {
  value = aws_instance.ansible.public_ip
}

output "jenkins_server_public_ip" {
  value = aws_instance.jenkins.public_ip
}
```

```
# terraform init

# terraform plan

# terraform apply
```

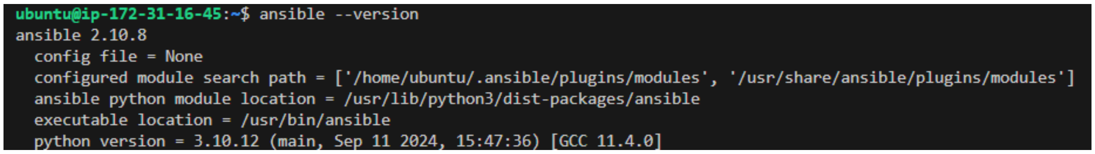


```
aws_instance.ansible: Creation complete after 16s [id=i-00c7670f2270f065a]
aws_instance.jenkins: Creation complete after 17s [id=i-086dfdf423ea6cb86]

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

Outputs:

ansible_server_public_ip = "3.128.91.5"
jenkins_server_public_ip = "18.117.88.79"
```

→LOGIN IN TO ANSIBLE SERVER AND CHECK ANSIBLE VERSION

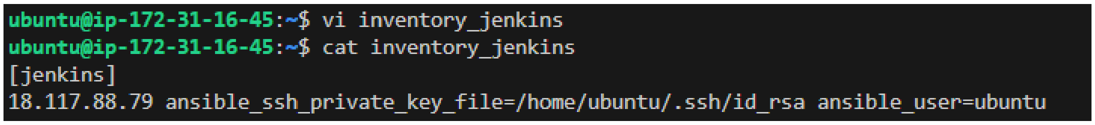
PS C:\Users\syedf\Desktop\DevOps\Patching_task> ssh -i "patching_key" ubuntu@3.128.91.5

# ansible --version



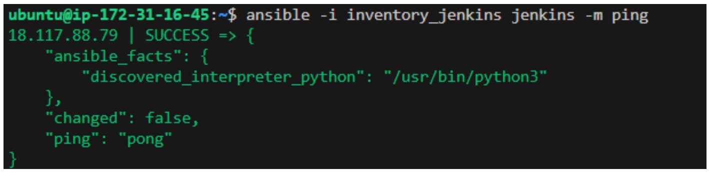
```
ubuntu@ip-172-31-16-45:~$ ansible --version
ansible 2.10.8
  config file = None
  configured module search path = ['/home/ubuntu/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  executable location = /usr/bin/ansible
  python version = 3.10.12 (main, Sep 11 2024, 15:47:36) [GCC 11.4.0]
```

→GENERATE SSH KEY AND COPY IT TO THE JENKINS SERVER IN .ssh AND MAKE THE INVENTORY FILE



```
ubuntu@ip-172-31-16-45:~$ vi inventory_jenkins
ubuntu@ip-172-31-16-45:~$ cat inventory_jenkins
[jenkins]
18.117.88.79 ansible_ssh_private_key_file=/home/ubuntu/.ssh/id_rsa ansible_user=ubuntu
```

→CHECK THE CONNECTIVITY



```
ubuntu@ip-172-31-16-45:~$ ansible -i inventory_jenkins jenkins -m ping
18.117.88.79 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "changed": false,
    "ping": "pong"
}
```

→LETS INSTALL A SPECIFIC VERSION OF JENKINS BY ANSIBLE PLAYBOOK

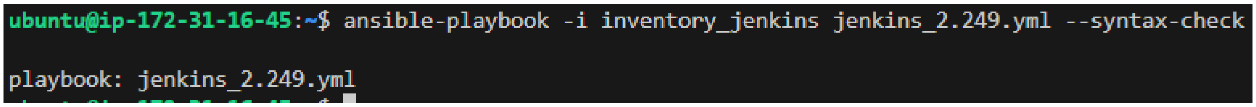
# vi jenkins_2.249.yml

Add the following to playbook

```
---
- name: Install a specific version of Jenkins
  hosts: jenkins
  become: yes

  tasks:
    - name: Add Jenkins repository key
      apt_key:
        url: https://pkg.jenkins.io/debian/jenkins.io-2023.key
        state: present

    - name: Add Jenkins repository
      apt_repository:
        repo: 'deb https://pkg.jenkins.io/debian-stable binary/'
        state: present

    - name: Install OpenJDK 11
      apt:
        name: openjdk-11-jdk
        state: present

    - name: Install specific version of Jenkins
      apt:
        name: jenkins=2.249.1
        state: present

    - name: Reload systemd manager configuration
      command: systemctl daemon-reload

    - name: Start and enable Jenkins service
      service:
        name: jenkins
        state: started
        enabled: yes
```

→check for syntax

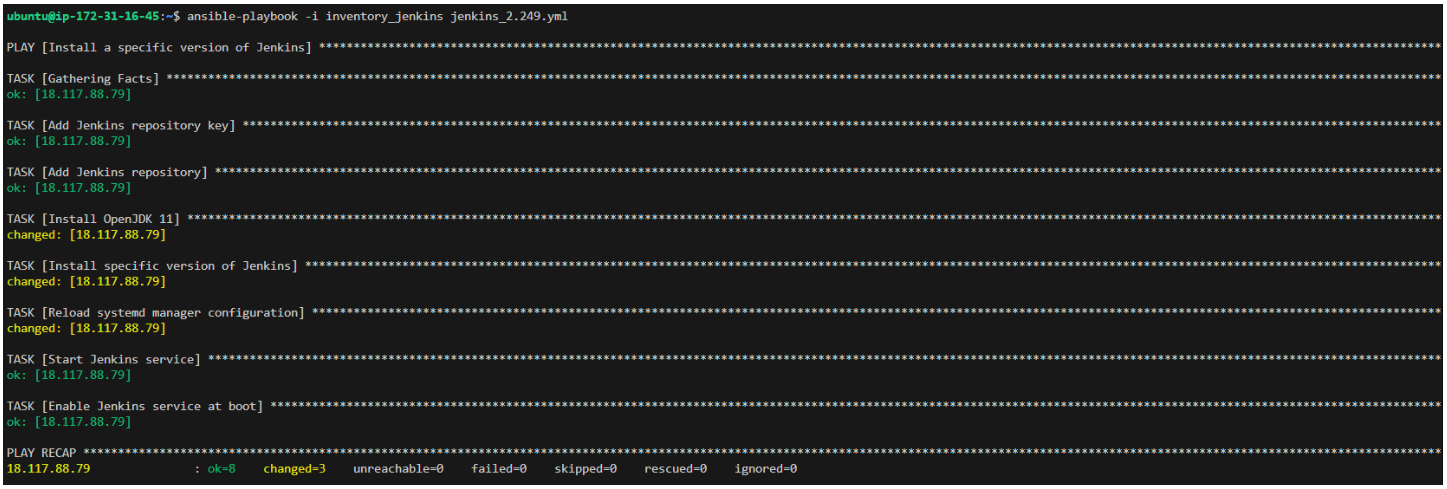
# ansible-playbook -i inventory_jenkins jenkins_2.249.yml --syntax-check



```
ubuntu@ip-172-31-16-45:~$ ansible-playbook -i inventory_jenkins jenkins_2.249.yml --syntax-check

playbook: jenkins_2.249.yml
```

→execute the playbook

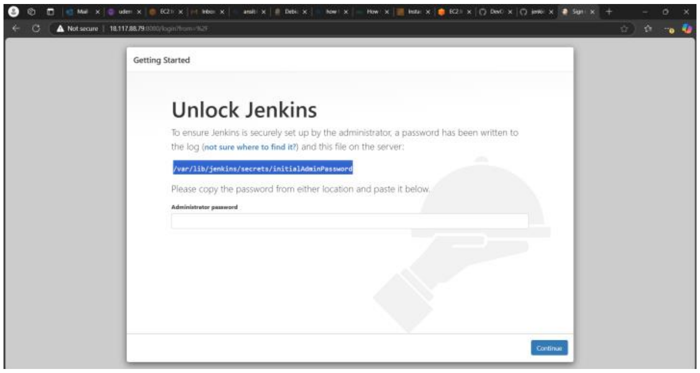
# ansible-playbook -i inventory_jenkins jenkins_2.249.yml



```
ubuntu@ip-172-31-16-45:~$ ansible-playbook -i inventory_jenkins jenkins_2.249.yml

PLAY [Install a specific version of Jenkins] ********************************************************************************************************************************

TASK [Gathering Facts] ******************************************************************************************************************************************************
ok: [18.117.88.79]

TASK [Add Jenkins repository key] *******************************************************************************************************************************************
ok: [18.117.88.79]

TASK [Add Jenkins repository] ***********************************************************************************************************************************************
ok: [18.117.88.79]

TASK [Install OpenJDK 11] ***************************************************************************************************************************************************
changed: [18.117.88.79]

TASK [Install specific version of Jenkins] **********************************************************************************************************************************
changed: [18.117.88.79]

TASK [Reload systemd manager configuration] *********************************************************************************************************************************
changed: [18.117.88.79]

TASK [Start Jenkins service] ************************************************************************************************************************************************
ok: [18.117.88.79]

TASK [Enable Jenkins service at boot] ***************************************************************************************************************************************
ok: [18.117.88.79]

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

→CHECK ON BROWSER WITH PUBLIC IP

>> ENTER THE PASSWORD ~ cat /var/lib/jenkins/secrets/initia*



Getting Started

Unlock Jenkins

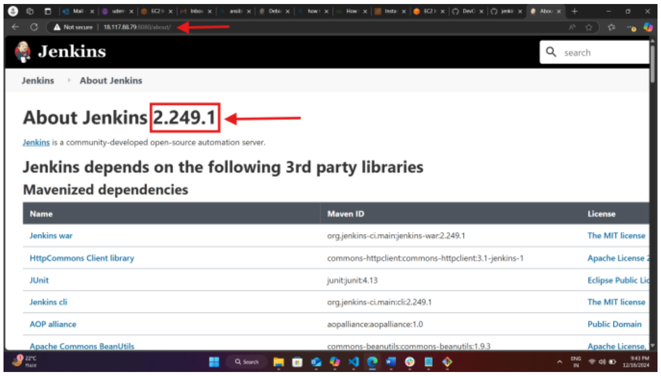
To ensure Jenkins is securely set up by the administrator, a password has been written to the log (not sure where to find it?) and this file on the server:

/var/lib/jenkins/secrets/initialAdminPassword

Please copy the password from either location and paste it below.

Administrator password

>>CHECK THE VERSION MANAGE JENKINS > ABOUT JENKINS



About Jenkins 2.249.1

Jenkins is a community-developed open-source automation server.

Jenkins depends on the following 3rd party libraries

Mavenized dependencies

Name	Maven ID	License
Jenkins war	org.jenkins-ci.main:jenkins-war:2.249.1	The MIT license
HttpCommons Client library	commons-httpclient:commons-httpclient:3.1-jenkins-1	Apache License 2
JUnit	junit:junit:4.13	Eclipse Public Lic
Jenkins cli	org.jenkins-ci.main:cli:2.249.1	The MIT license
AOP alliance	aopalliance:aopalliance:1.0	Public Domain
Apache Commons BeanUtils	commons-beanutils:commons-beanutils:1.9.3	Apache License,

>>we have achieved the specific version of jenkins which is 2.249.1

>>now we need to continue with our patching activity which means upgrading our current version with latest

>>lets create another playbook by which this upgrade will take place

<MAKE SURE YOU CREATE A BACKUP OF JENKINS>

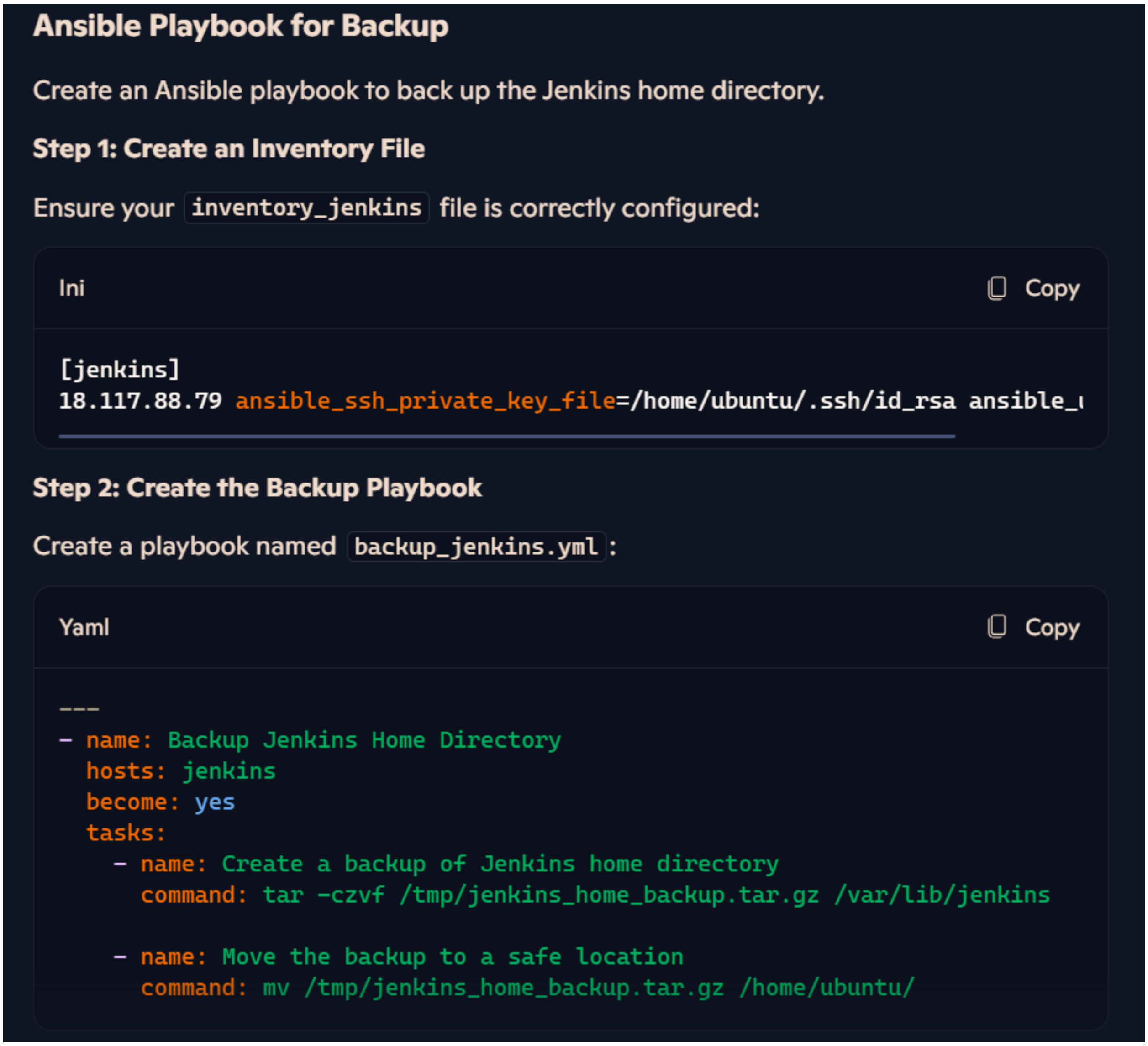
Why Take a Backup?

1. Risk Mitigation: If something goes wrong during the upgrade process, you can restore the previous state without losing data or configurations.
2. Data Protection: Ensures that all your jobs, configurations, and plugins are safe in case of an upgrade failure.
3. Quick Recovery: Allows for a faster recovery process, minimizing downtime and disruptions.

Take an AWS Snapshot (if using AWS)

1. Navigate to the EC2 Dashboard in the AWS Management Console.
2. Select the Jenkins Instance, click on Actions, then Image and templates, and select Create image.
3. Follow the Prompts to create an image, which will serve as a snapshot.

<OR>



Ansible Playbook for Backup

Create an Ansible playbook to back up the Jenkins home directory.

Step 1: Create an Inventory File

Ensure your `inventory_jenkins` file is correctly configured:

```ini
[jenkins]
18.117.88.79 ansible_ssh_private_key_file=/home/ubuntu/.ssh/id_rsa ansible_
```

Step 2: Create the Backup Playbook

Create a playbook named `backup_jenkins.yml`:

```yaml
---
- name: Backup Jenkins Home Directory
  hosts: jenkins
  become: yes
  tasks:
    - name: Create a backup of Jenkins home directory
      command: tar -czvf /tmp/jenkins_home_backup.tar.gz /var/lib/jenkins

    - name: Move the backup to a safe location
      command: mv /tmp/jenkins_home_backup.tar.gz /home/ubuntu/
```

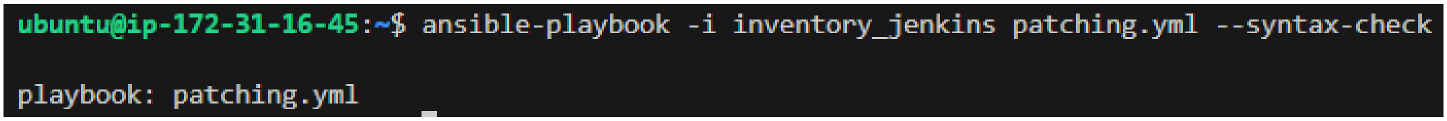
→LETS UPGRADE THE JENKINS THROUGH ANSIBLE-PLAYBOOK

# vi patching.yml

```
---
- name: Upgrade Jenkins and Java to the latest version
  hosts: jenkins
  become: yes

  tasks:
    - name: Update apt cache
      apt:
        update_cache: yes

    - name: Install latest version of OpenJDK 17
      apt:
        name: openjdk-17-jdk
        state: latest

    - name: Upgrade Jenkins to the latest version
      apt:
        name: jenkins
        state: latest

    - name: Reload systemd manager configuration
      command: systemctl daemon-reload

    - name: Restart Jenkins service
      service:
        name: jenkins
        state: restarted
```

→check for syntax

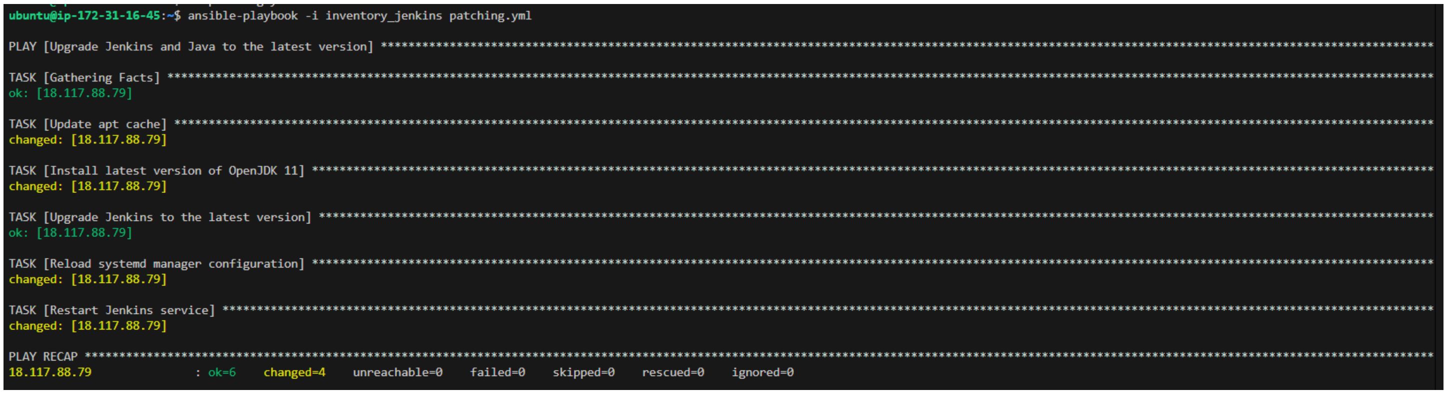
# ansible-playbook -i inventory_jenkins patching.yml --syntax-check



```
ubuntu@ip-172-31-16-45:~$ ansible-playbook -i inventory_jenkins patching.yml --syntax-check

playbook: patching.yml
```

→execute the playbook

# ansible-playbook -i inventory_jenkins patching.yml

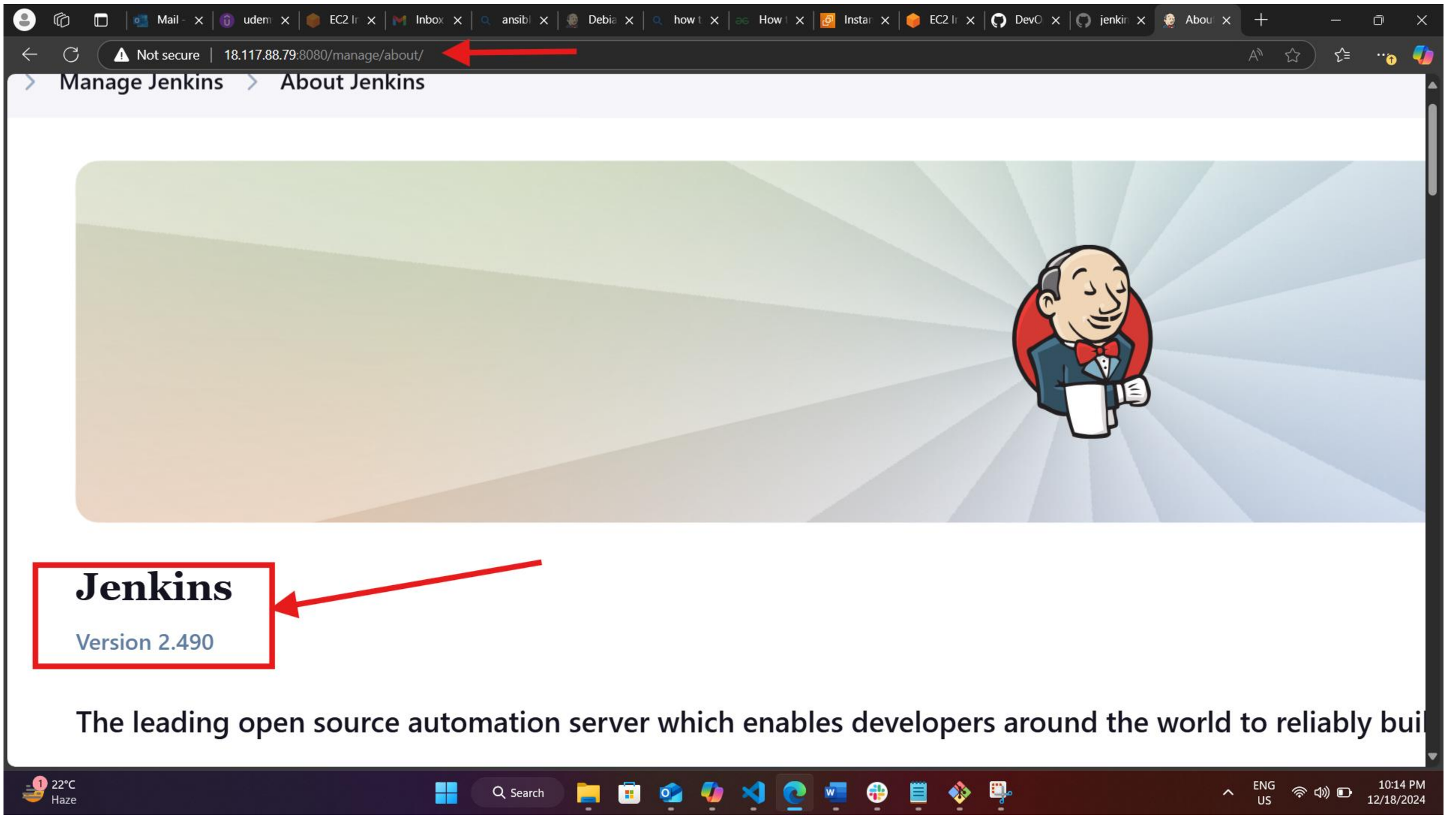


```
ubuntu@ip-172-31-16-45:~$ ansible-playbook -i inventory_jenkins patching.yml

PLAY [Upgrade Jenkins and Java to the latest version] ***************************************************************************************************************

TASK [Gathering Facts] **********************************************************************************************************************************************
ok: [18.117.88.79]

TASK [Update apt cache] *********************************************************************************************************************************************
changed: [18.117.88.79]

TASK [Install latest version of OpenJDK 11] *************************************************************************************************************************
changed: [18.117.88.79]

TASK [Upgrade Jenkins to the latest version] ************************************************************************************************************************
ok: [18.117.88.79]

TASK [Reload systemd manager configuration] *************************************************************************************************************************
changed: [18.117.88.79]

TASK [Restart Jenkins service] **************************************************************************************************************************************
changed: [18.117.88.79]

PLAY RECAP **********************************************************************************************************************************************************
18.117.88.79               : ok=6    changed=4    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

→CHECK ON BROWSER WITH PUBLIC IP

>>LOGIN

MANAGE JENKINS > ABOUT JENKINS



18.117.88.79:8080/manage/about/

Manage Jenkins > About Jenkins

Jenkins

Version 2.490

The leading open source automation server which enables developers around the world to reliably buil