**Ramez Chreide**

**Course End Project** - **Automating Infrastructure using Terraform**

**Problem Statement:**

**Use Terraform to build a virtual machine and install other required automation tools in it.**

* Launch an EC2 instance using Terraform
* Connect to the instance
* Install Jenkins, Java and Python in the instance

**Tools required:** Terraform, AWS account with security credentials, Keypair

**Solution:**

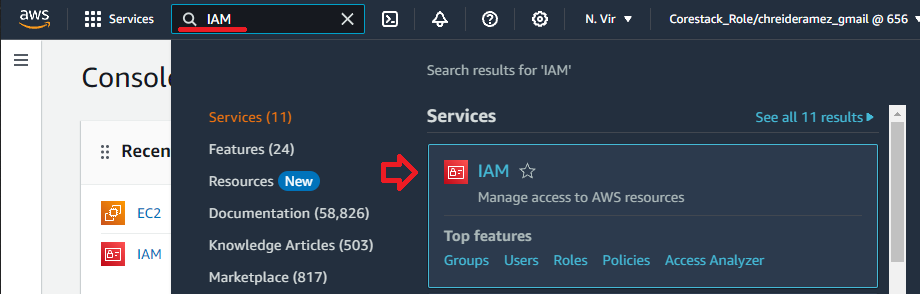
**Step 1: Check if Terraform Core is installed on the Lab VM:**

**# terraform --version**

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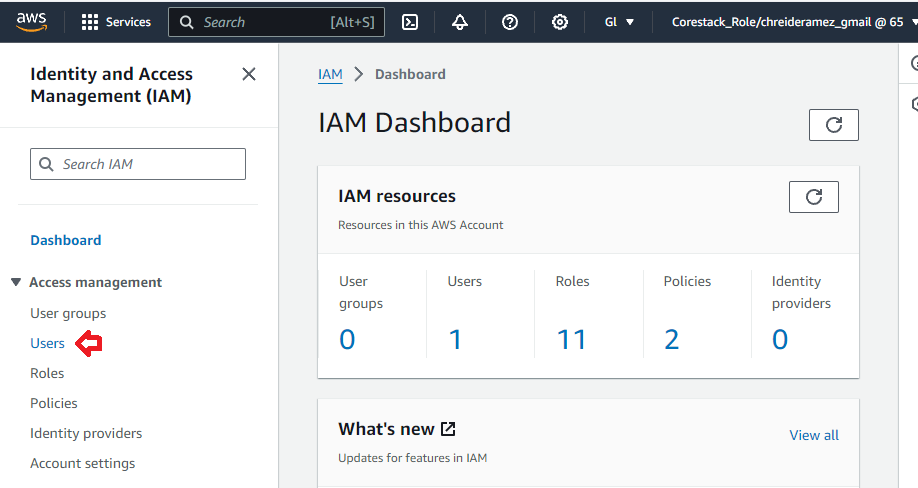
**Step 2: Create AWS user and security credentials:**

**In the search box, give IAM and select it.**

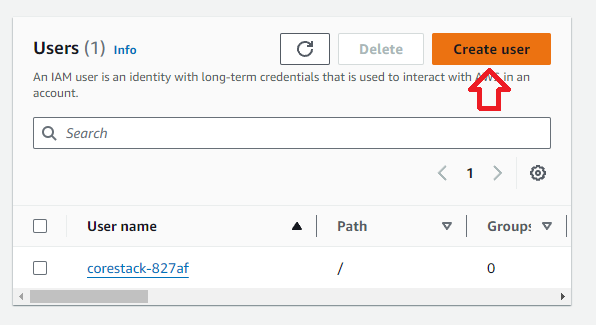
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**You will be on IAM dashboard**

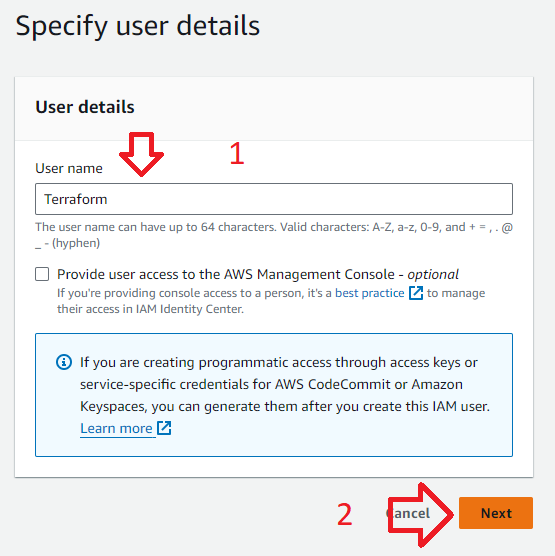
**On the left side→ click on Users**

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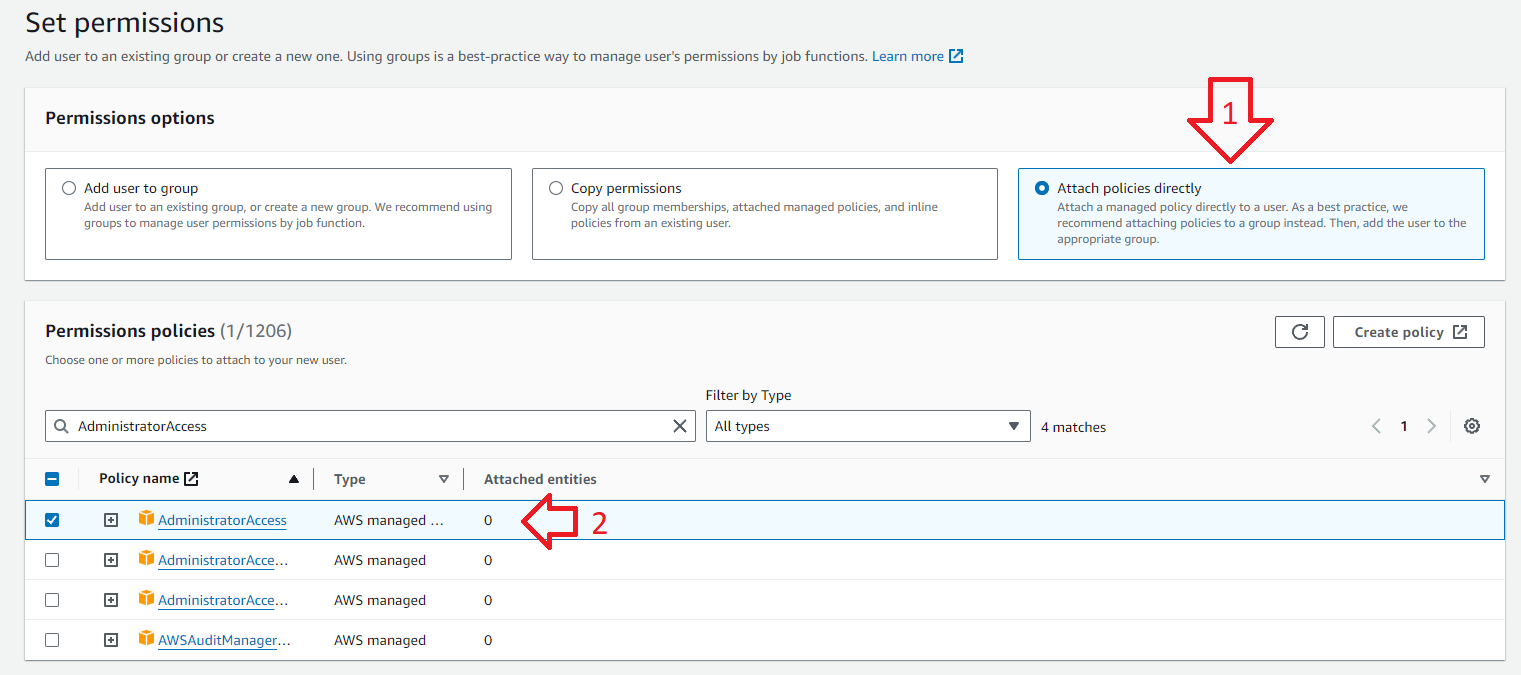
**Click on Create user button**

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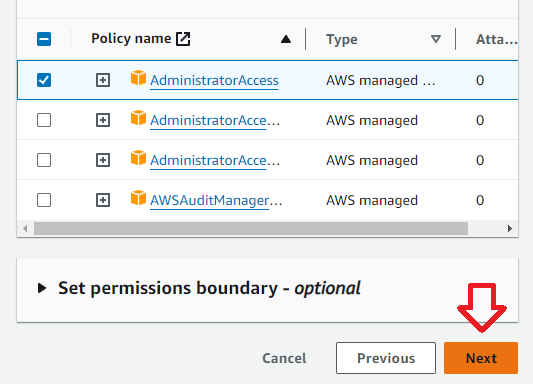
**under User details give User name as Terraform → click on next**

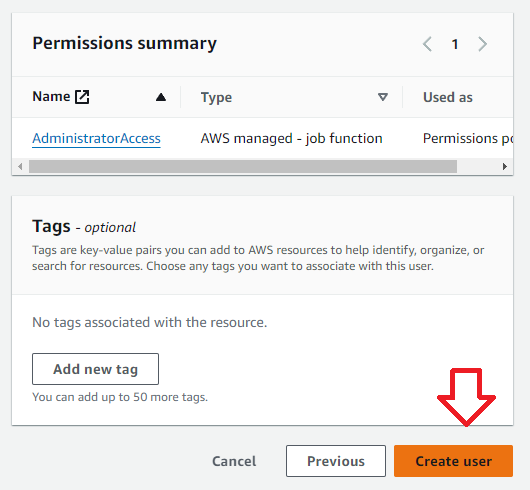
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**Select 3rd option Attach policies directly →scroll down and from list search for AdministratorAccess and click on it**

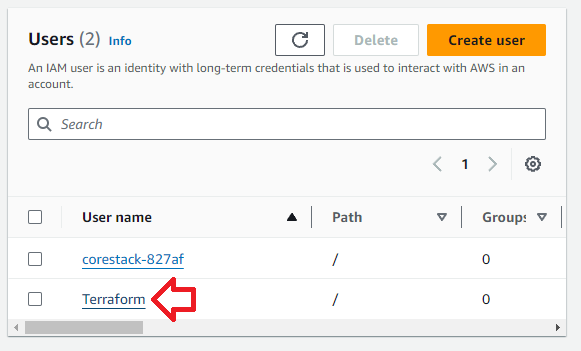
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**Scroll down → click next → scroll down and click on Create User.**

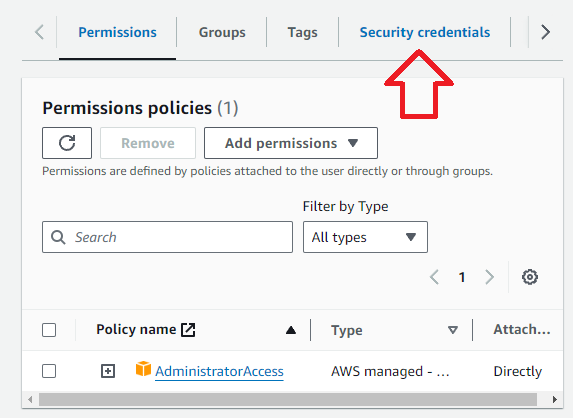
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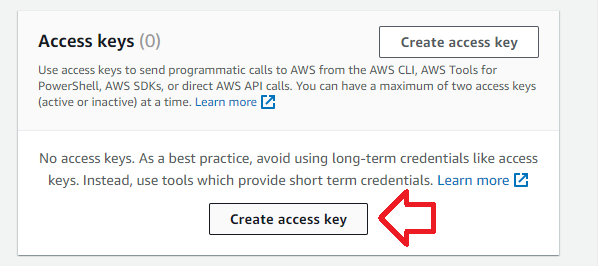
**Click on the user name Terraform**

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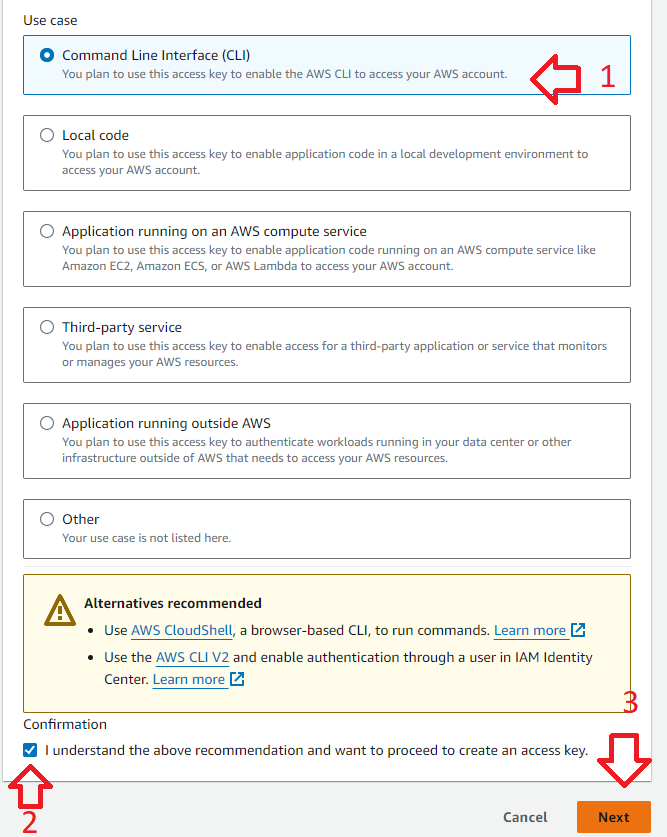
**Click on security credentials tab**

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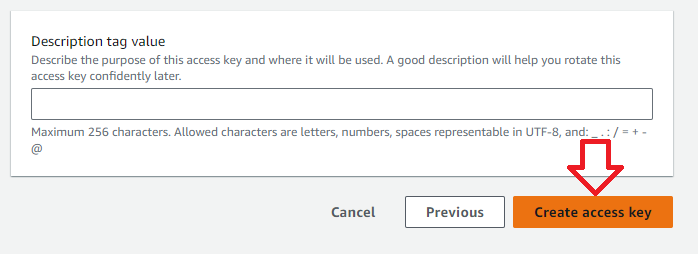
**Scroll down to access key→ click on create access key**

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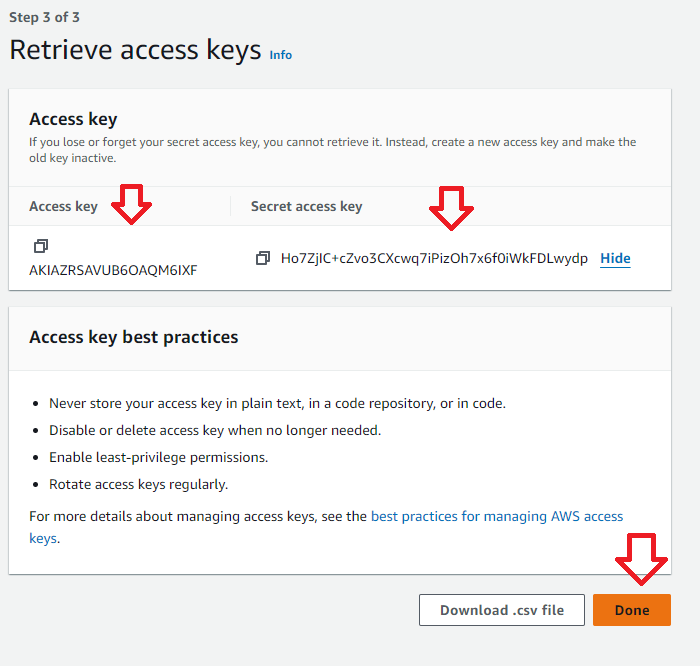
**Click on Command Line Interface (CLI) → Scroll down→Select the box of→ I understand the above recommendation and want to proceed to create an access key. → click on next**

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**Click on create access key**

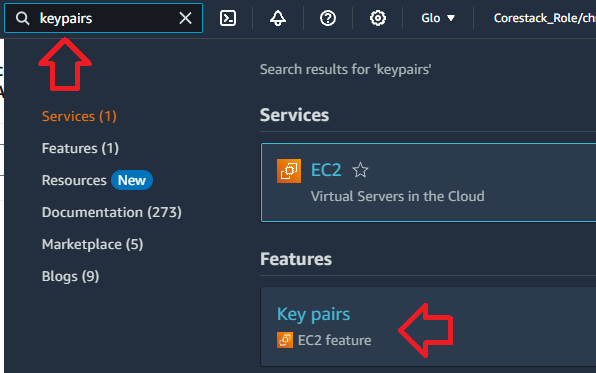
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**Click Show Secret Access Key -> Copy Access Key and Secret Access key to Notepad -> Click Done**

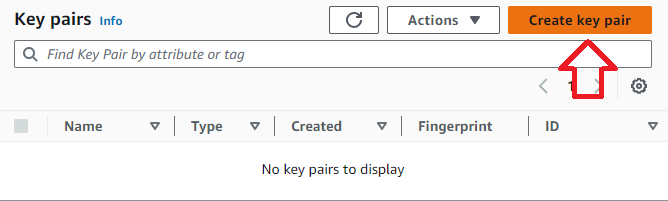
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**Step 4: Create a key pair in AWS, we will use this keypair to connect to the ec2 instance**

**Select keypairs in the search box and click on key pairs**

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**Click on create key pair**

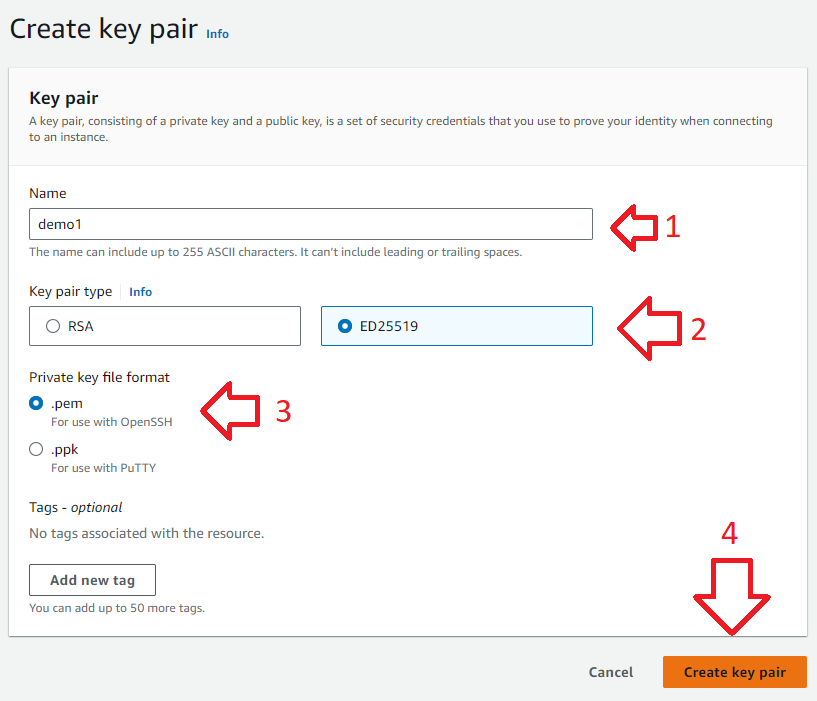
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**Give name : demo1**

**Select Key pair type : ED25519**

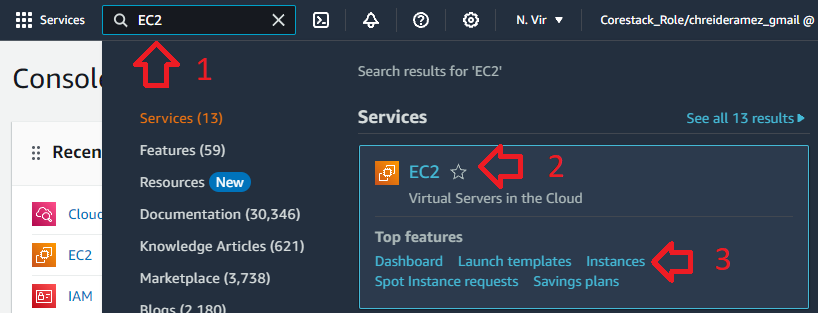
**Select Private key file format : .pem**

**Click Create key pair**

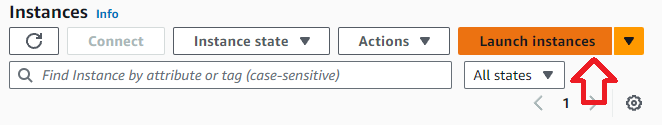
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**Step 5: Get EC2 AMI Instance type t2 micro**

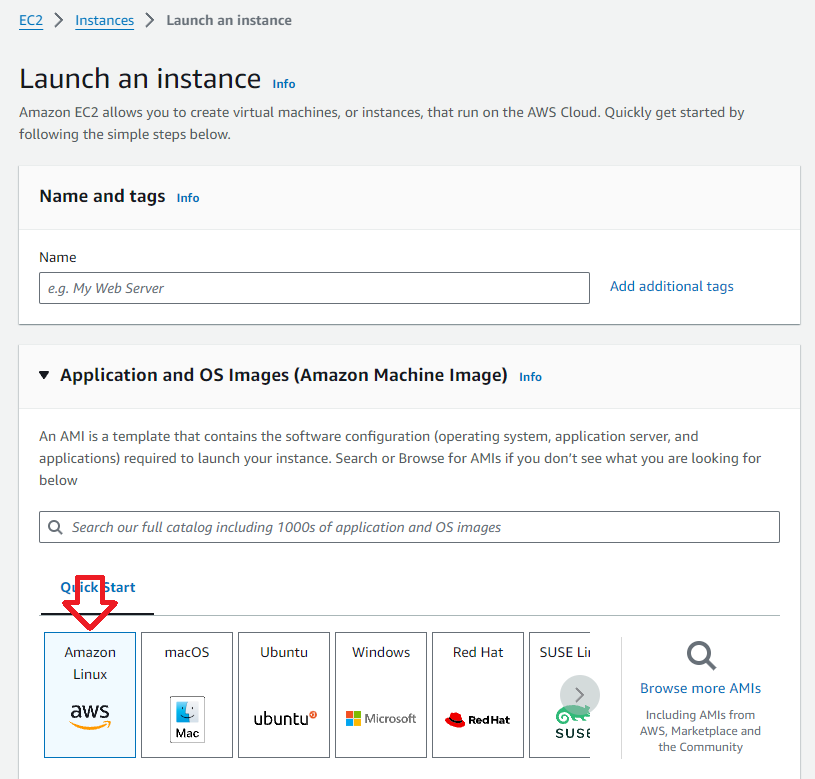
**In Search Box type EC2 -> In Services EC2 look at Top features -> Click on Instances**

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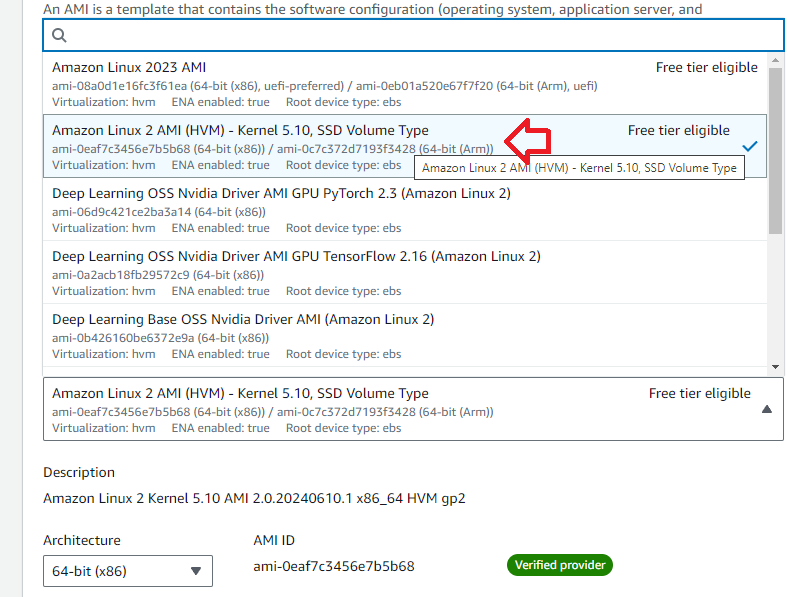
**Click on Launch Instances**

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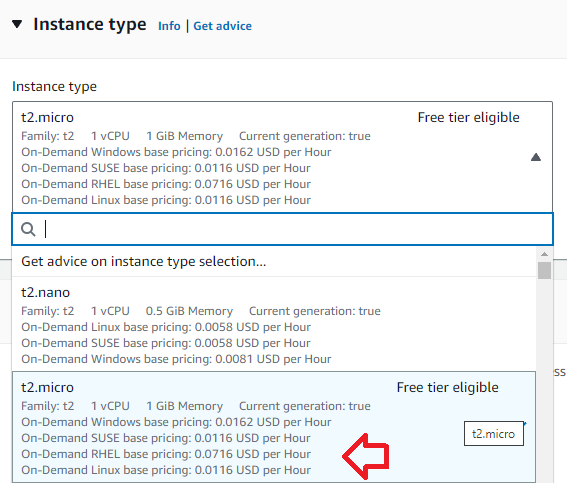
**Scroll down -> Under Application and OS Images -> Click Amazon Linux**

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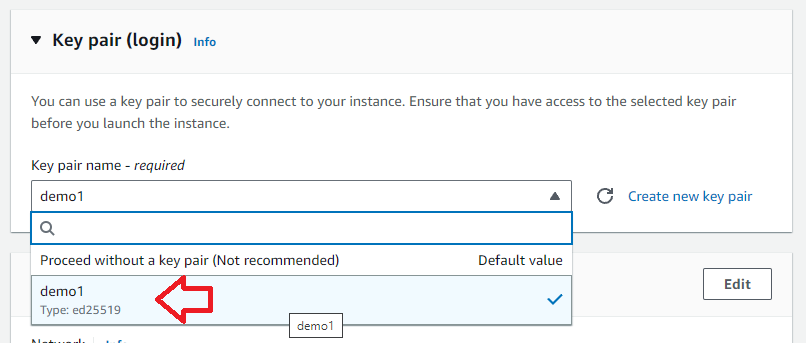
**Look for Amazon Machine Image (AMI) -> Press on Box under it -> Select Amazon Linux 2 AMI (HVM) -> Save AMI ID on notepad**

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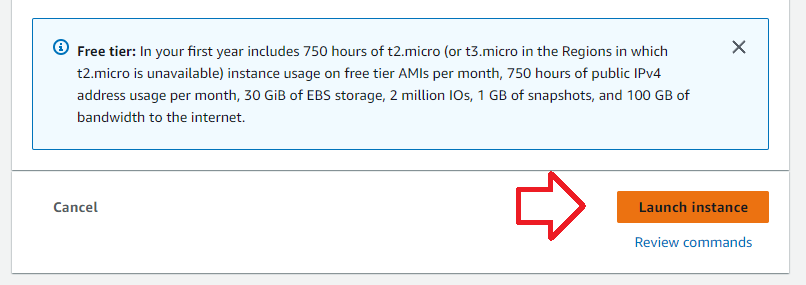
**Scroll down -> Under Instance Type make sure t2.micro is selected**

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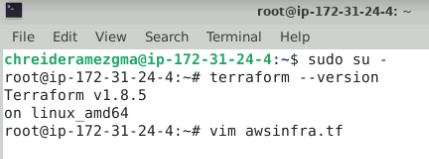
**Scroll down -> Select demo1 for key pair(login)**

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**Scroll down -> Click on Launch instance**

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**Step 6: Prepare the terraform configuration file with provider and resource blocks**

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**In the configuration file , we will use:**

* **Provider : aws**
* **Resource: security\_group**
* **Resource: aws\_instance**
* **Resource: aws\_network\_interface\_sg\_attachment**

**Final code:**

**provider "aws" {**

**access\_key = "AKIAZRSAVUB6OAQM6IXF"**

**secret\_key = "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"**

**region = "us-east-1"**

**}**

**resource "aws\_security\_group" "mysg" {**

**name = "mysg"**

**description = "Allow inbound SSH and HTTP"**

**ingress {**

**description = "SSH"**

**from\_port = 22**

**to\_port = 22**

**protocol = "tcp"**

**cidr\_blocks = ["0.0.0.0/0"]**

**ipv6\_cidr\_blocks = ["::/0"]**

**}**

**ingress {**

**description = "HTTP"**

**from\_port = 8080**

**to\_port = 8080**

**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"]**

**}**

**}**

**resource "aws\_instance" "myec2" {**

**ami = "ami-0eaf7c3456e7b5b68"**

**instance\_type = "t2.micro"**

**key\_name = "demo1"**

**tags = {**

**Name = "instance-1"**

**}**

**user\_data = <<-EOF**

**#!/bin/bash**

**sudo yum install git -y**

**sudo amazon-linux-extras install java-openjdk11 -y**

**sudo wget -O /etc/yum.repos.d/jenkins.repo https://pkg.jenkins.io/redhat-stable/jenkins.repo**

**sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io-2023.key**

**sudo yum install jenkins -y**

**su”do systemctl start jenkins**

**sudo yum install python3 -y**

**EOF**

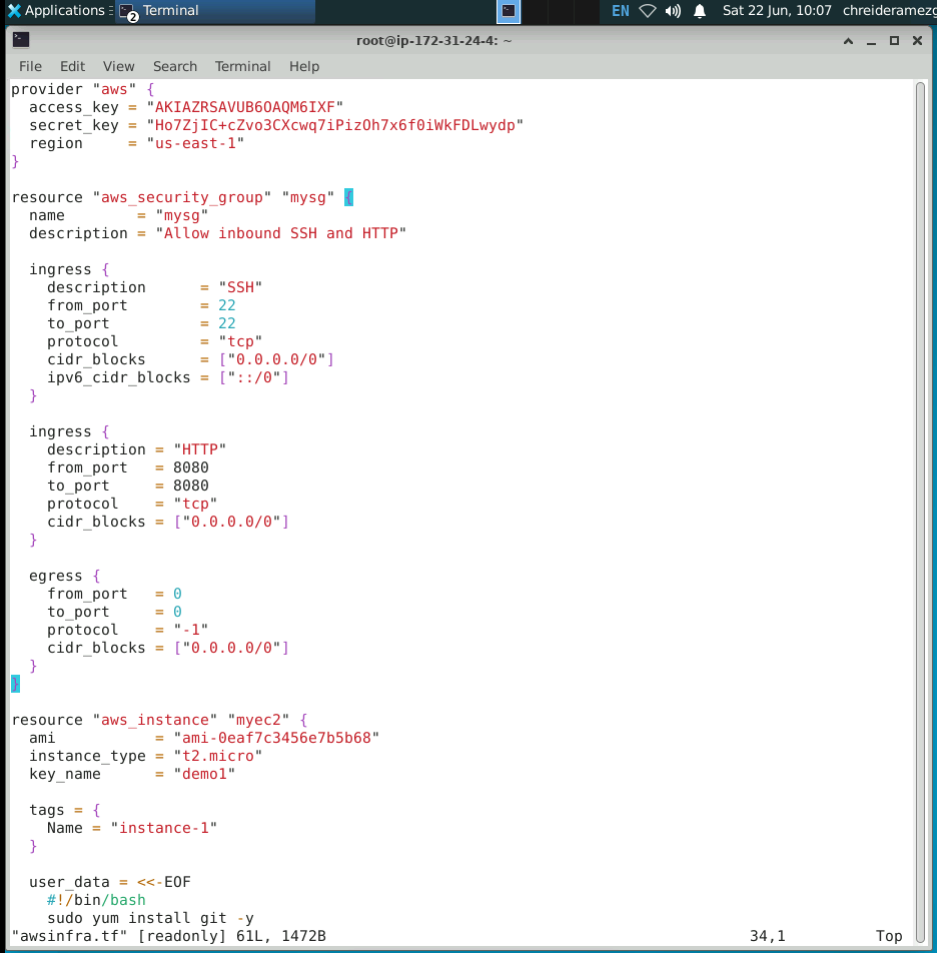
**}**

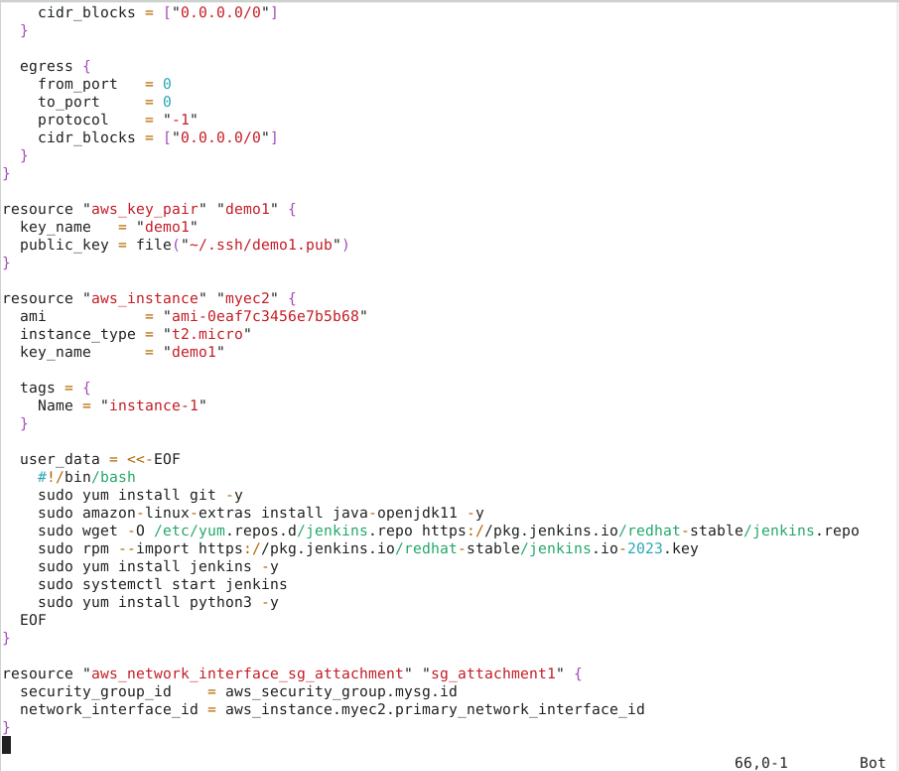
**resource "aws\_network\_interface\_sg\_attachment" "sg\_attachment1" {**

**security\_group\_id = aws\_security\_group.mysg.id**

**network\_interface\_id = aws\_instance.myec2.primary\_network\_interface\_id**

**}**

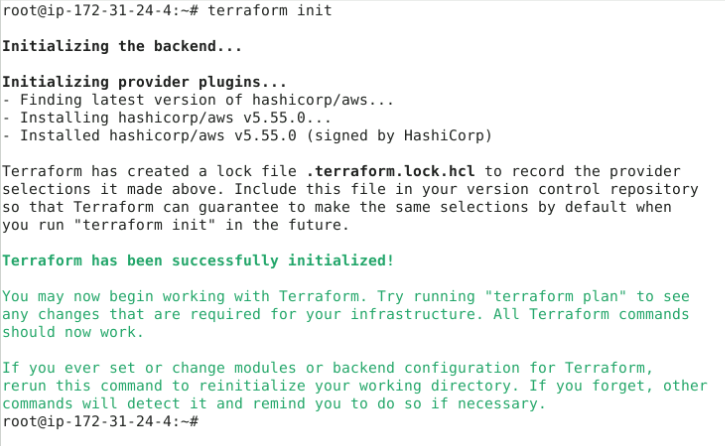
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**Step 7: Execute the terraform configuration**

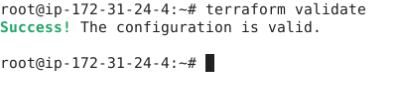
**# terraform init**

**to initialize the configuration.**

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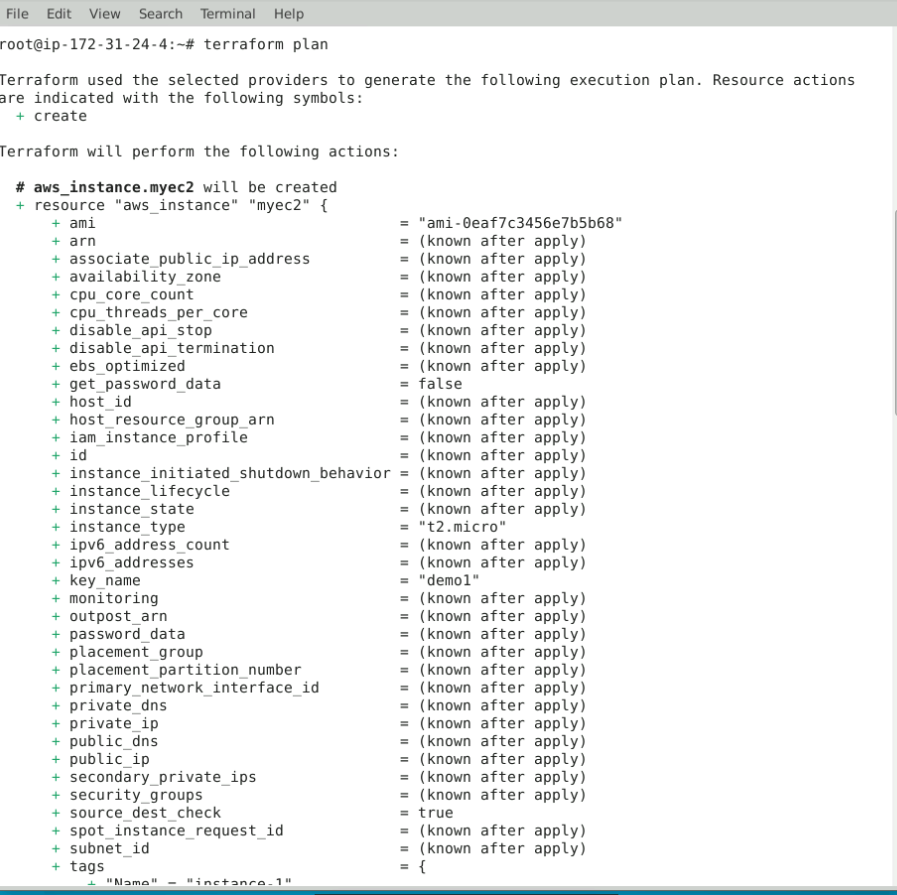
**# terraform validate**

**to ensure your configuration is syntactically correct.**

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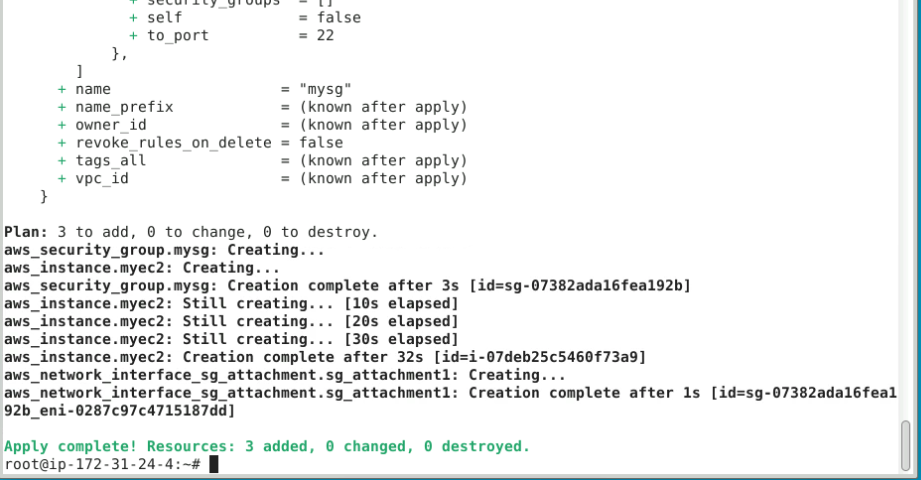
**# terraform plan**

**to create an execution plan and review the changes that will be made by Terraform.**

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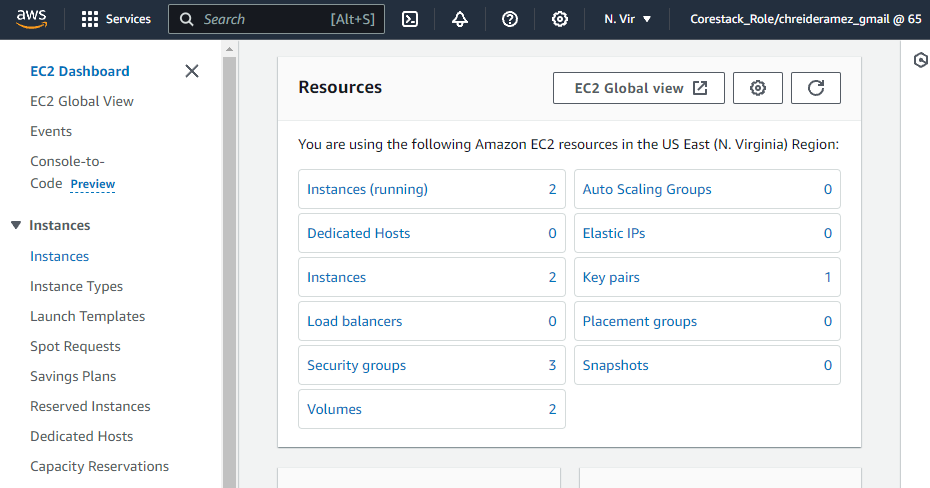
**# terraform apply --auto-approve**

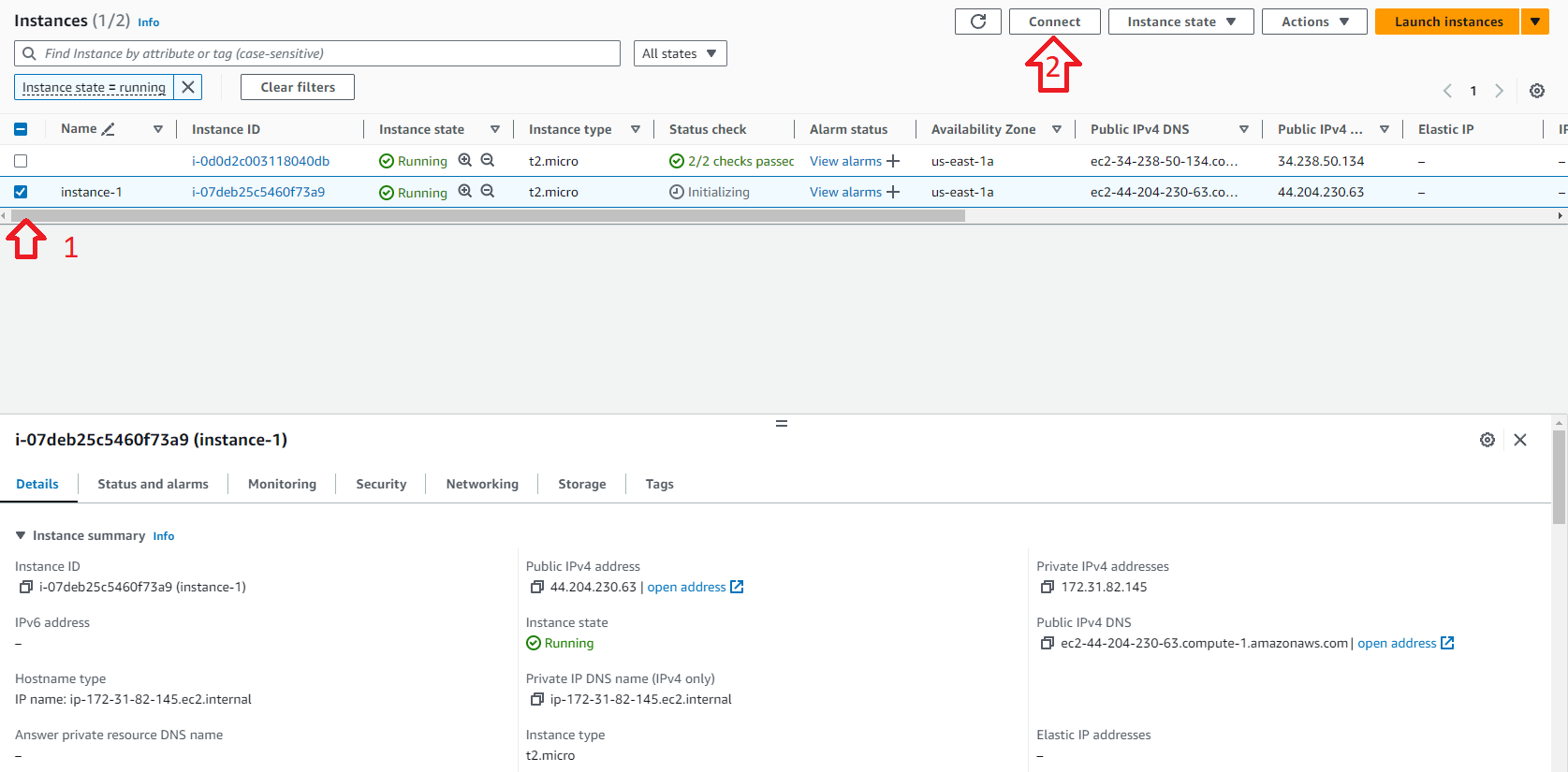
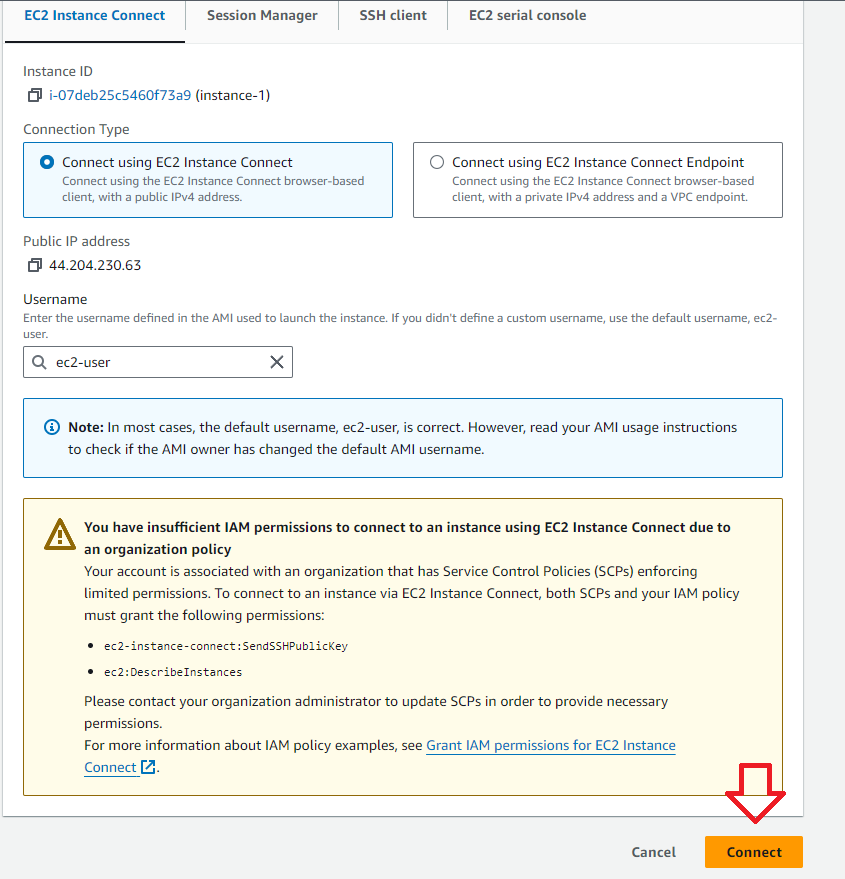
**to apply the configuration and create the specified resources.**

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**Step 8: Validate and check if the tools have been installed on the VM or not.**

**Go to EC2 -> Instances**

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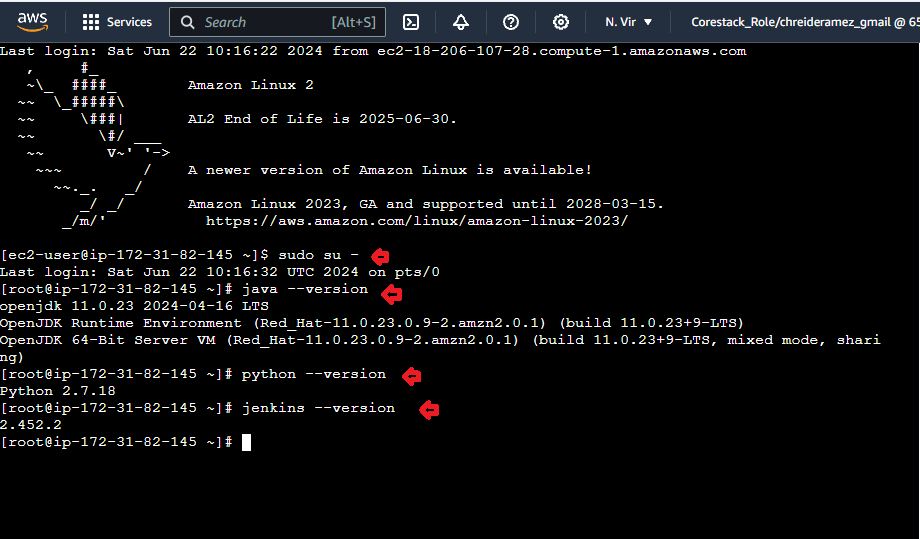
**Select instance-1 -> Click ConnectScroll down -> Click Connect**

**sudo su -**

**java -- version**

**python -- version**

**jenkins -- version**

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**Completed the project**

**Ramez Chreide**