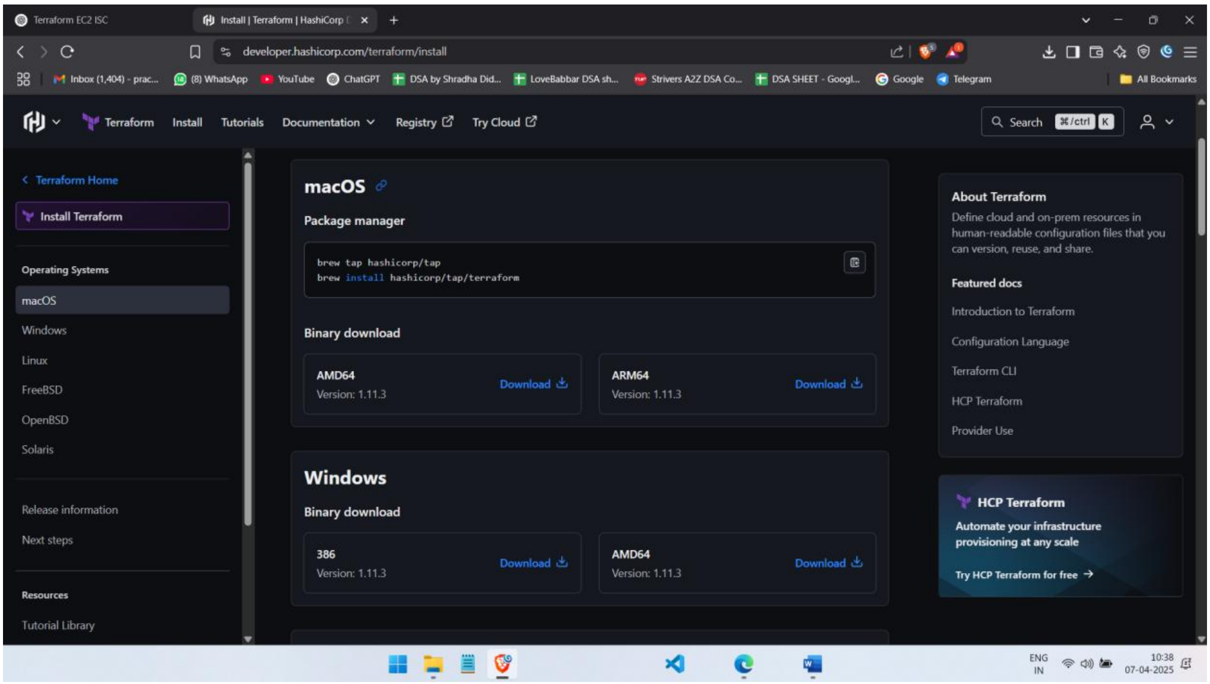
ASSIGNMENT NO : 07

Title: Write IaC using terraform to create EC2 machine on AWS or Azure or Google cloud. (Compulsory to use Input and output variable files)

Procedure :

1. Download and install Terraform :



macOS

Package manager

```
brew tap hashicorp/tap
brew install hashicorp/tap/terraform
```

Binary download

AMD64 Version: 1.11.3 Download

ARM64 Version: 1.11.3 Download

Windows

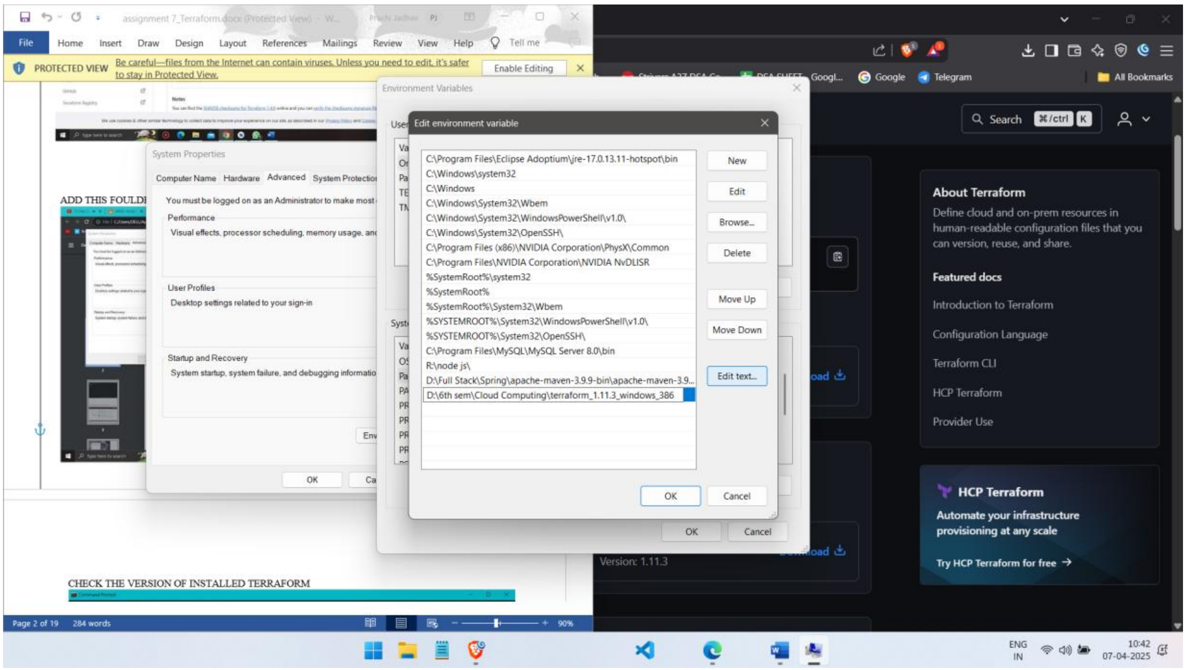
Binary download

386 Version: 1.11.3 Download

AMD64 Version: 1.11.3 Download

Install | Terraform | HashiCorp
developer.hashicorp.com/terraform/install
Terraform Home
Install Terraform
Operating Systems
macOS
Windows
Linux
FreeBSD
OpenBSD
Solaris
Release information
Next steps
Resources
Tutorial Library
About Terraform
Define cloud and on-prem resources in human-readable configuration files that you can version, reuse, and share.
Featured docs
Introduction to Terraform
Configuration Language
Terraform CLI
HCP Terraform
Provider Use
HCP Terraform
Automate your infrastructure provisioning at any scale
Try HCP Terraform for free

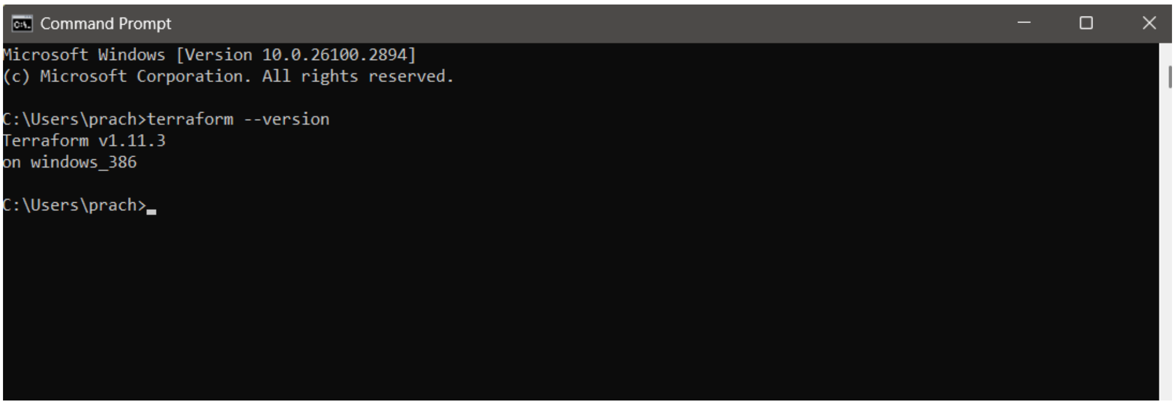
Add this folder directory to path.



Edit environment variable

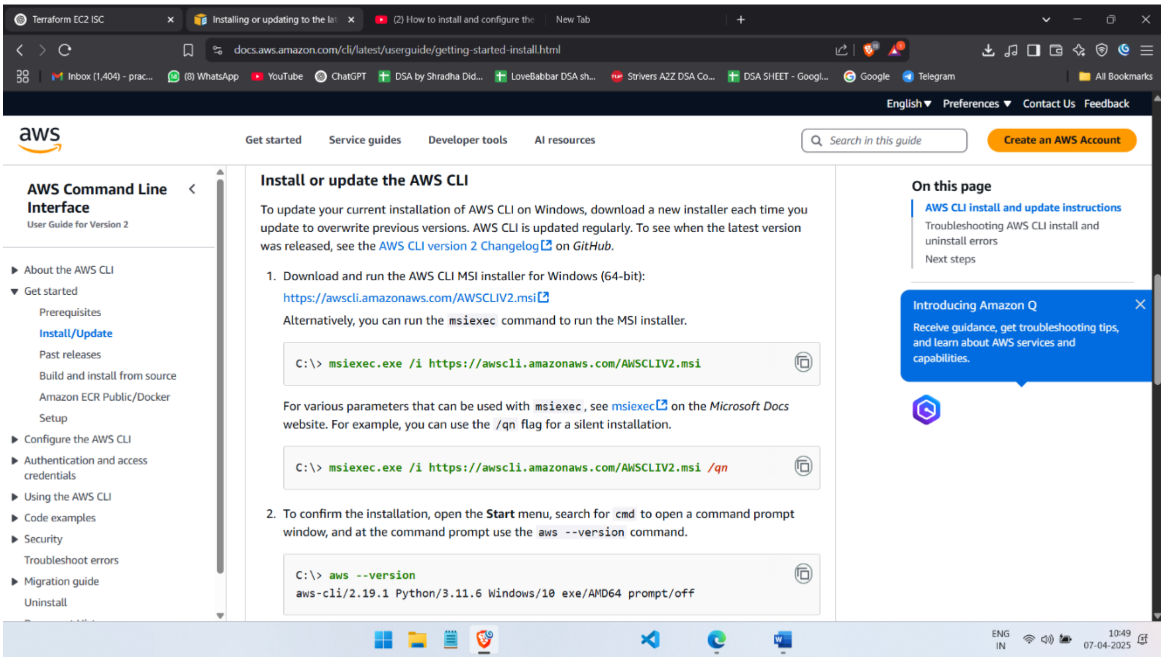
```
C:\Program Files\Eclipse Adoptium\jre-17.0.13.11-hotspot\bin
C:\Windows\system32
C:\Windows
C:\Windows\System32\Wbem
C:\Windows\System32\WindowsPowerShell\v1.0\
C:\Windows\System32\OpenSSH\
C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common
C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR
%SystemRoot%\system32
%SystemRoot%
%SystemRoot%\System32\Wbem
%SYSTEMROOT%\System32\WindowsPowerShell\v1.0\
%SYSTEMROOT%\System32\OpenSSH\
C:\Program Files\MySQL\MySQL Server 8.0\bin
R:\node js\
D:\Full Stack\Spring\apache-maven-3.9.9-bin\apache-maven-3.9...
D:\6th sem\Cloud Computing\terraform_1.11.3_windows_386
```

Check the version of installed terraform.



```
Microsoft Windows [Version 10.0.26100.2894]
(c) Microsoft Corporation. All rights reserved.

C:\Users\prach>terraform --version
Terraform v1.11.3
on windows_386

C:\Users\prach>_
```

2. Download AWS Command Line Interface and configure it.



Install or update the AWS CLI

To update your current installation of AWS CLI on Windows, download a new installer each time you update to overwrite previous versions. AWS CLI is updated regularly. To see when the latest version was released, see the AWS CLI version 2 Changelog on *GitHub*.

1. Download and run the AWS CLI MSI installer for Windows (64-bit):

   https://awscli.amazonaws.com/AWSCLIV2.msi

   Alternatively, you can run the `msiexec` command to run the MSI installer.

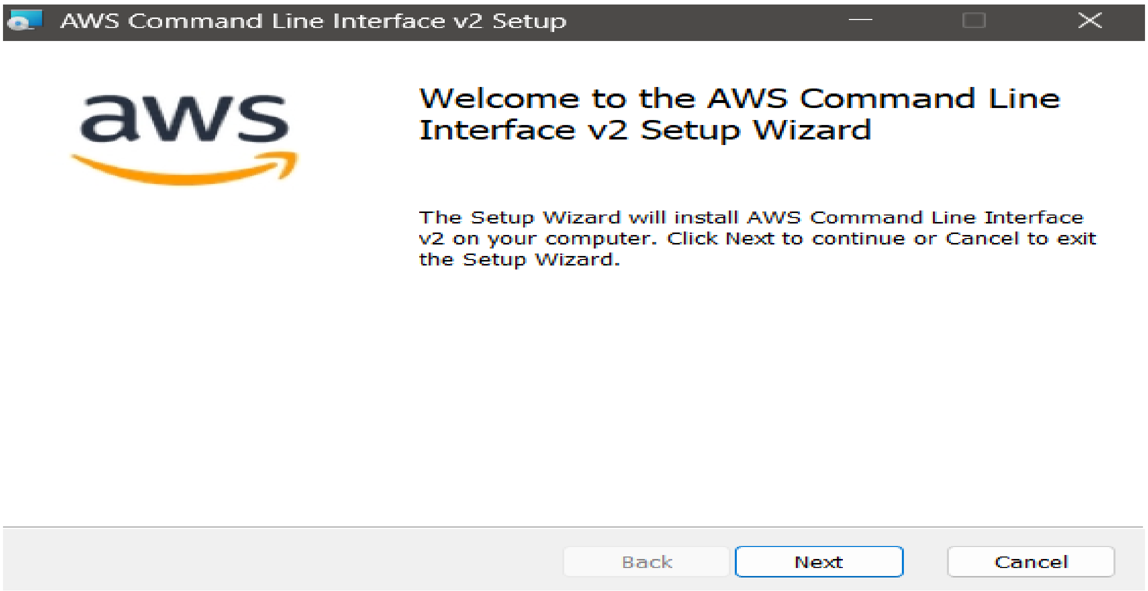
   ```
   C:\> msiexec.exe /i https://awscli.amazonaws.com/AWSCLIV2.msi
   ```

   For various parameters that can be used with `msiexec`, see msiexec on the *Microsoft Docs* website. For example, you can use the `/qn` flag for a silent installation.

   ```
   C:\> msiexec.exe /i https://awscli.amazonaws.com/AWSCLIV2.msi /qn
   ```

2. To confirm the installation, open the **Start** menu, search for `cmd` to open a command prompt window, and at the command prompt use the `aws --version` command.

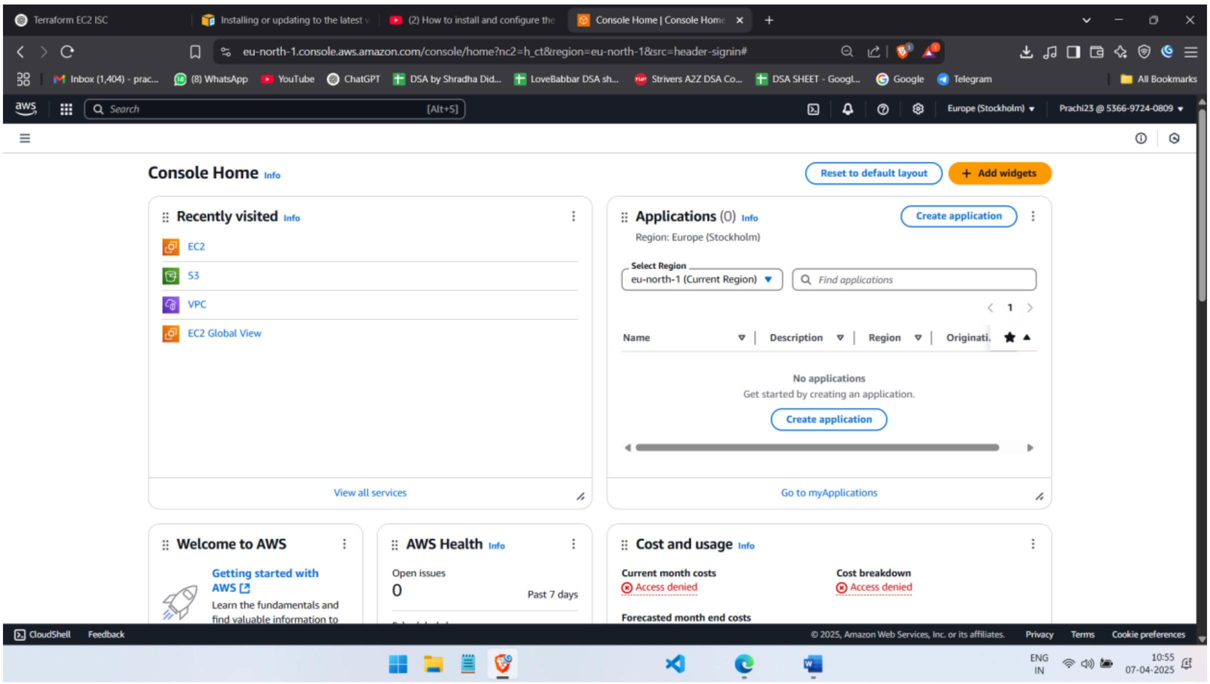
   ```
   C:\> aws --version
   aws-cli/2.19.1 Python/3.11.6 Windows/10 exe/AMD64 prompt/off
   ```



Welcome to the AWS Command Line Interface v2 Setup Wizard

The Setup Wizard will install AWS Command Line Interface v2 on your computer. Click Next to continue or Cancel to exit the Setup Wizard.

3. Login to AWS and search for IAM service.



Console Home Info

Reset to default layout

+ Add widgets

Recently visited Info

- EC2
- S3
- VPC
- EC2 Global View

View all services

Applications (0) Info

Create application

Region: Europe (Stockholm)

Select Region

eu-north-1 (Current Region) ▾

Find applications

1

Name	Description	Region	Originati...

No applications

Get started by creating an application.

Create application

Go to myApplications

Welcome to AWS

Getting started with AWS

Learn the fundamentals and find valuable information to

AWS Health Info

Open issues

0

Past 7 days

Cost and usage Info

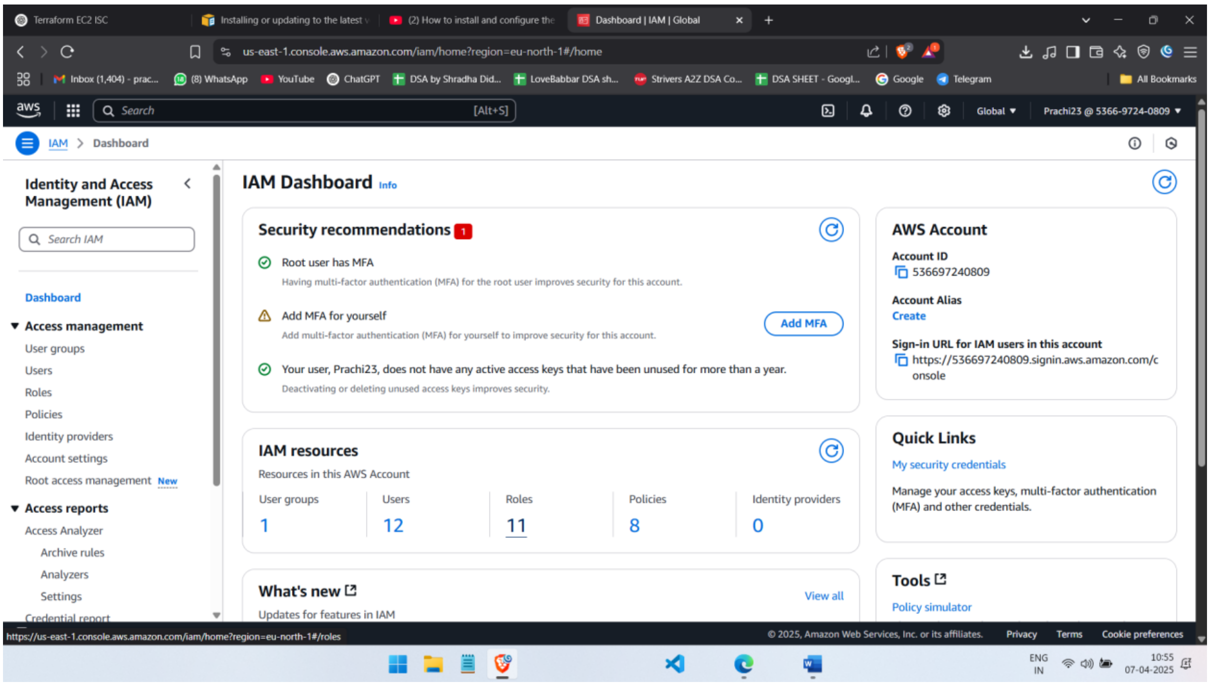
Current month costs

Access denied

Cost breakdown

Access denied

Forecasted month end costs


Terraform EC2 ISC
Installing or updating to the latest v
(2) How to install and configure the
Dashboard | IAM | Global
us-east-1.console.aws.amazon.com/iam/home?region=eu-north-1#/home
Inbox (1,404) - prac...
(8) WhatsApp
YouTube
ChatGPT
DSA by Shradha Did...
LoveBabbar DSA sh...
Strivers A2Z DSA Co...
DSA SHEET - Googl...
Google
Telegram
All Bookmarks
aws
Search
[Alt+S]
Global ▾
Prachi23 @ 5366-9724-0809 ▾
https://us-east-1.console.aws.amazon.com/iam/home?region=eu-north-1#/roles
© 2025, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences
ENG
IN
10:55
07-04-2025

IAM > Dashboard

Identity and Access Management (IAM)

Search IAM

Dashboard

▾ Access management

- User groups
- Users
- Roles
- Policies
- Identity providers
- Account settings
- Root access management New

▾ Access reports

- Access Analyzer
  - Archive rules
  - Analyzers
  - Settings
- Credential report

IAM Dashboard Info

Security recommendations 1

Root user has MFA

Having multi-factor authentication (MFA) for the root user improves security for this account.

Add MFA for yourself

Add multi-factor authentication (MFA) for yourself to improve security for this account.

Add MFA

Your user, Prachi23, does not have any active access keys that have been unused for more than a year.

Deactivating or deleting unused access keys improves security.

IAM resources

Resources in this AWS Account

User groups	Users	Roles	Policies	Identity providers
1	12	11	8	0

What's new

View all

Updates for features in IAM

AWS Account

Account ID

536697240809

Account Alias

Create

Sign-in URL for IAM users in this account

https://536697240809.signin.aws.amazon.com/console

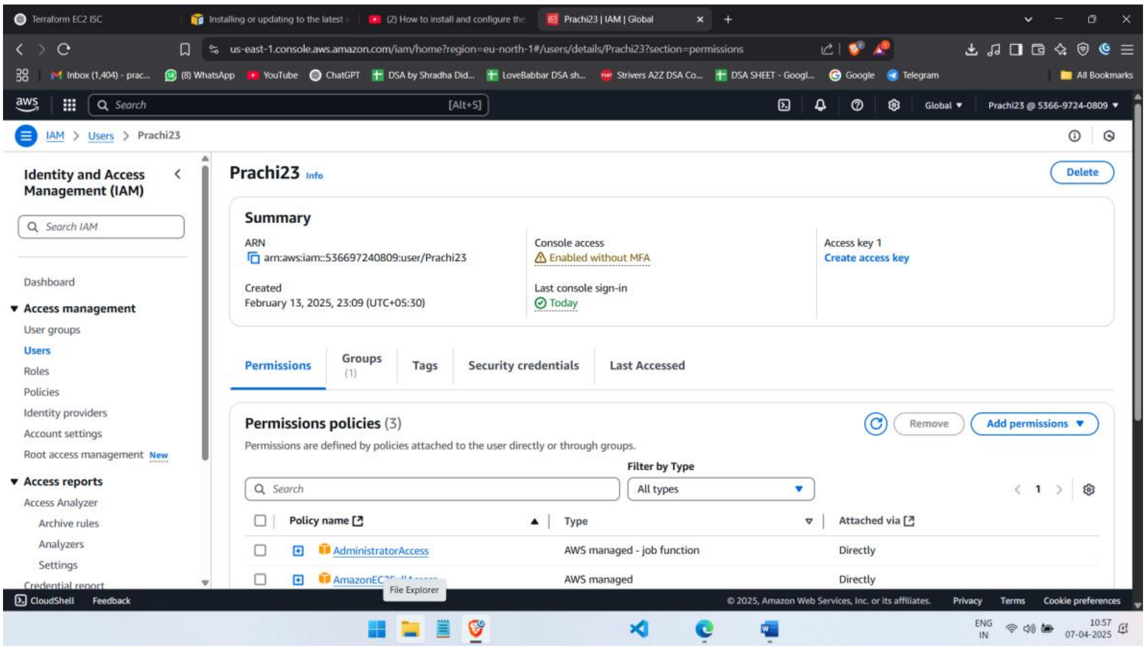
Quick Links

My security credentials

Manage your access keys, multi-factor authentication (MFA) and other credentials.

Tools

Policy simulator



Prachi23 Info

Summary

ARN
arn:aws:iam::536697240809:user/Prachi23

Created
February 13, 2025, 23:09 (UTC+05:30)

Console access
Enabled without MFA

Last console sign-in
Today

Access key 1
Create access key

Permissions | Groups (1) | Tags | Security credentials | Last Accessed

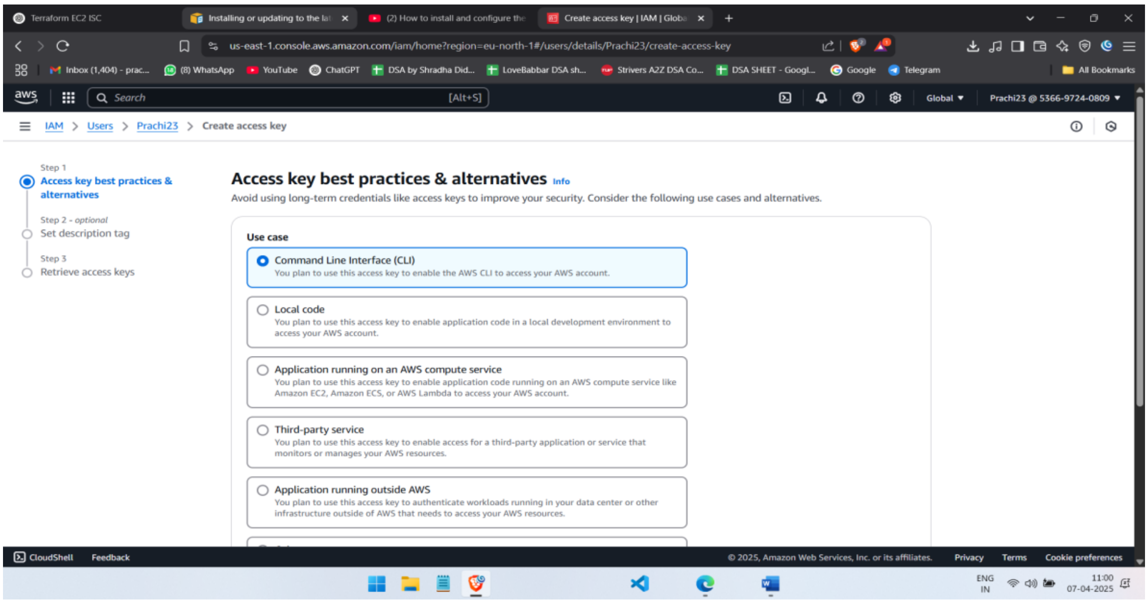
Permissions policies (3)

Permissions are defined by policies attached to the user directly or through groups.

Filter by Type: All types

Policy name	Type	Attached via
AdministratorAccess	AWS managed - job function	Directly
AmazonEC2FullAccess	AWS managed	Directly

Create an Access key



Terraform EC2 ISC
Installing or updating to the lat
(2) How to install and configure the
Create access key | IAM | Global
us-east-1.console.aws.amazon.com/iam/home?region=eu-north-1#/users/details/Prachi23/create-access-key
aws
Search
[Alt+S]
Global ▼
Prachi23 @ 5366-9724-0809 ▼
IAM
Users
Prachi23
Create access key
CloudShell
Feedback
© 2025, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences
ENG IN
11:00 07-04-2025

Step 1
● Access key best practices & alternatives

Step 2 - optional
○ Set description tag

Step 3
○ Retrieve access keys

Access key best practices & alternatives Info

Avoid using long-term credentials like access keys to improve your security. Consider the following use cases and alternatives.

Use case

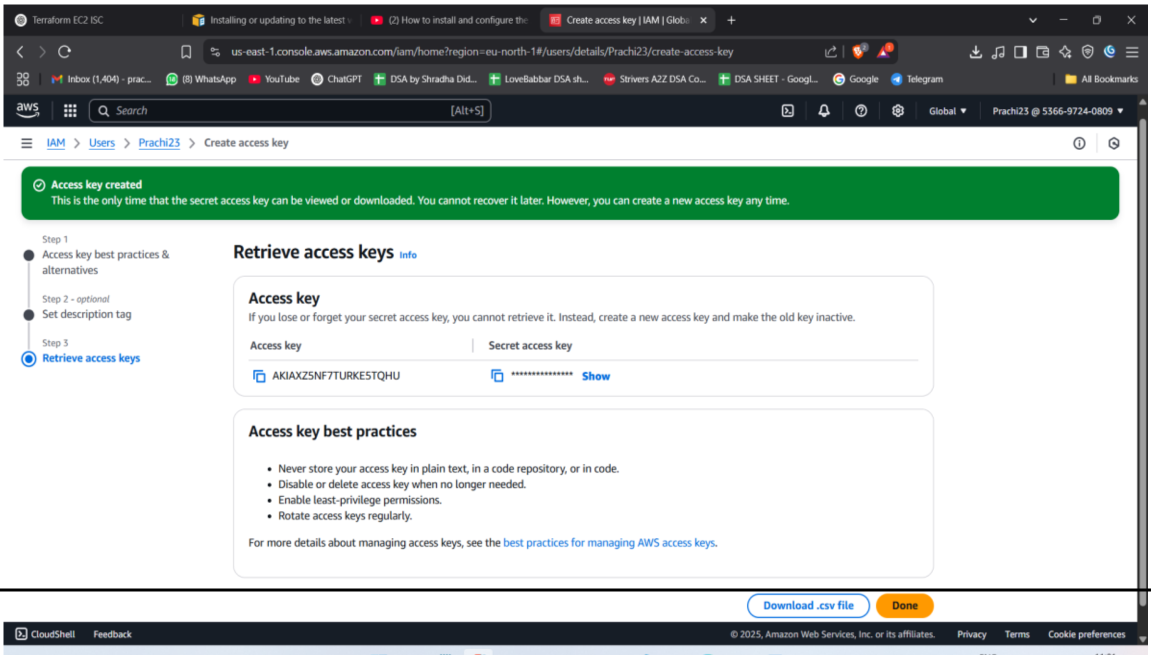
● Command Line Interface (CLI)
You plan to use this access key to enable the AWS CLI to access your AWS account.

○ Local code
You plan to use this access key to enable application code in a local development environment to access your AWS account.

○ Application running on an AWS compute service
You plan to use this access key to enable application code running on an AWS compute service like Amazon EC2, Amazon ECS, or AWS Lambda to access your AWS account.

○ Third-party service
You plan to use this access key to enable access for a third-party application or service that monitors or manages your AWS resources.

○ Application running outside AWS
You plan to use this access key to authenticate workloads running in your data center or other infrastructure outside of AWS that needs to access your AWS resources.



Terraform EC2 ISC
Installing or updating to the latest v
(2) How to install and configure the
Create access key | IAM | Global
us-east-1.console.aws.amazon.com/iam/home?region=eu-north-1#/users/details/Prachi23/create-access-key
aws
Search
[Alt+S]
Global ▼
Prachi23 @ 5366-9724-0809 ▼
IAM
Users
Prachi23
Create access key
Download .csv file
Done
CloudShell
Feedback
© 2025, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

Access key created
This is the only time that the secret access key can be viewed or downloaded. You cannot recover it later. However, you can create a new access key any time.

Step 1
● Access key best practices & alternatives

Step 2 - optional
● Set description tag

Step 3
● Retrieve access keys

Retrieve access keys Info

Access key

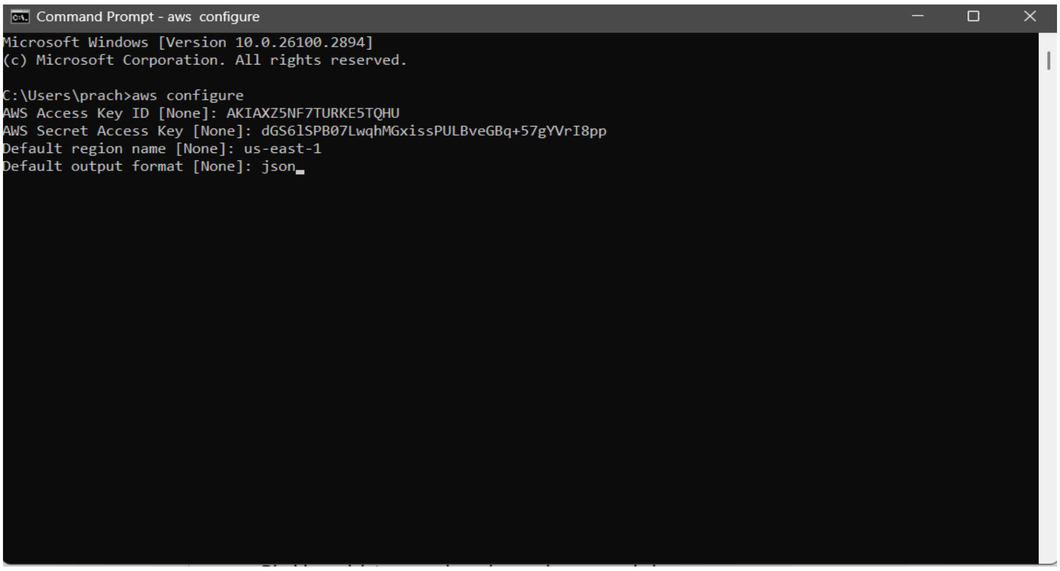
If you lose or forget your secret access key, you cannot retrieve it. Instead, create a new access key and make the old key inactive.

Access key	Secret access key
AKIAXZ5NF7TURKE5TQHU	*************** Show

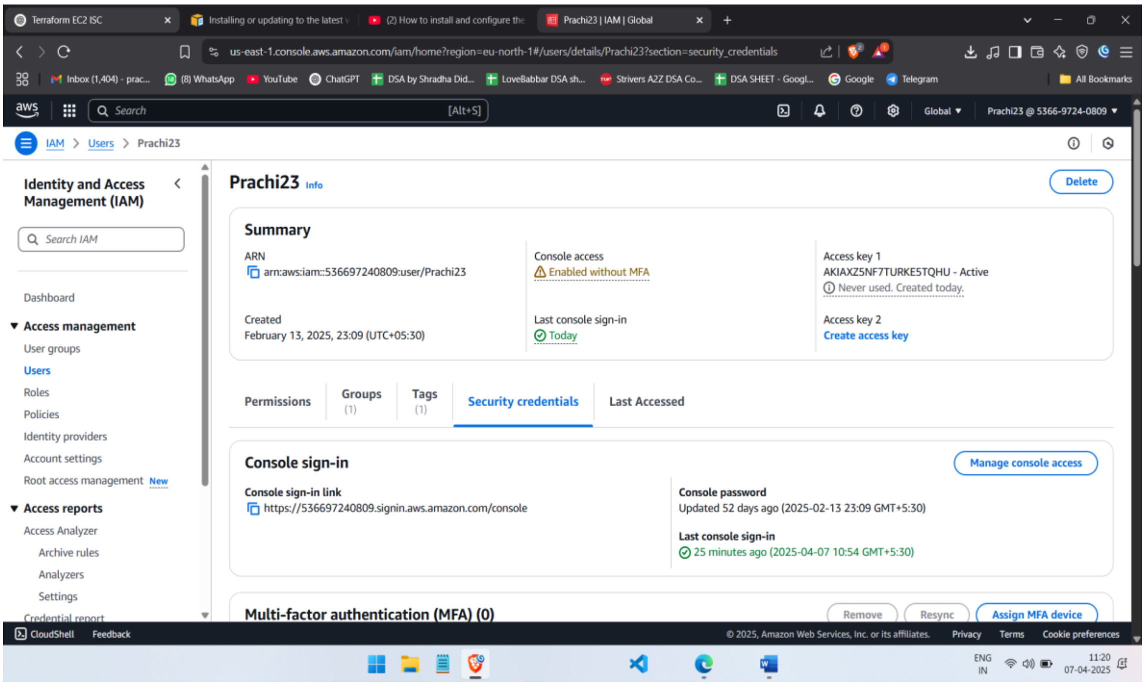
Access key best practices

- Never store your access key in plain text, in a code repository, or in code.
- Disable or delete access key when no longer needed.
- Enable least-privilege permissions.
- Rotate access keys regularly.

For more details about managing access keys, see the best practices for managing AWS access keys.



```
Microsoft Windows [Version 10.0.26100.2894]
(c) Microsoft Corporation. All rights reserved.

C:\Users\prach>aws configure
AWS Access Key ID [None]: AKIAXZ5NF7TURKE5TQHU
AWS Secret Access Key [None]: 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
Default region name [None]: us-east-1
Default output format [None]: json_
```



us-east-1.console.aws.amazon.com/iam/home?region=eu-north-1#/users/details/Prachi23?section=security_credentials

Prachi23 Info

Summary

ARN
arn:aws:iam::536697240809:user/Prachi23

Created
February 13, 2025, 23:09 (UTC+05:30)

Console access
Enabled without MFA

Last console sign-in
Today

Access key 1
AKIAXZ5NF7TURKE5TQHU - Active
Never used. Created today.

Access key 2
Create access key

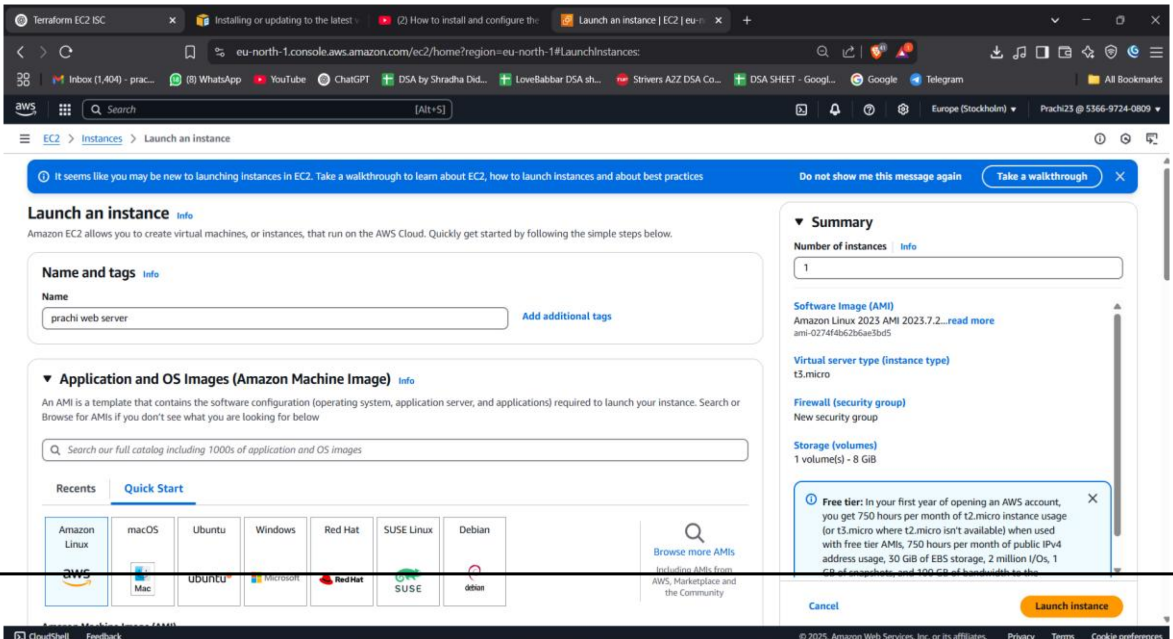
Console sign-in

Console sign-in link
https://536697240809.signin.aws.amazon.com/console

Console password
Updated 52 days ago (2025-02-13 23:09 GMT+5:30)

Last console sign-in
25 minutes ago (2025-04-07 10:54 GMT+5:30)

Multi-factor authentication (MFA) (0)



eu-north-1.console.aws.amazon.com/ec2/home?region=eu-north-1#LaunchInstances:

It seems like you may be new to launching instances in EC2. Take a walkthrough to learn about EC2, how to launch instances and about best practices

Launch an instance Info

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

Name and tags Info

Name: prachi web server

Application and OS Images (Amazon Machine Image) Info

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Search our full catalog including 1000s of application and OS images

Summary

Number of instances Info: 1

Software Image (AMI)
Amazon Linux 2023 AMI 2023.7.2...read more
ami-0274f4b62b6ae3bd5

Virtual server type (instance type)
t3.micro

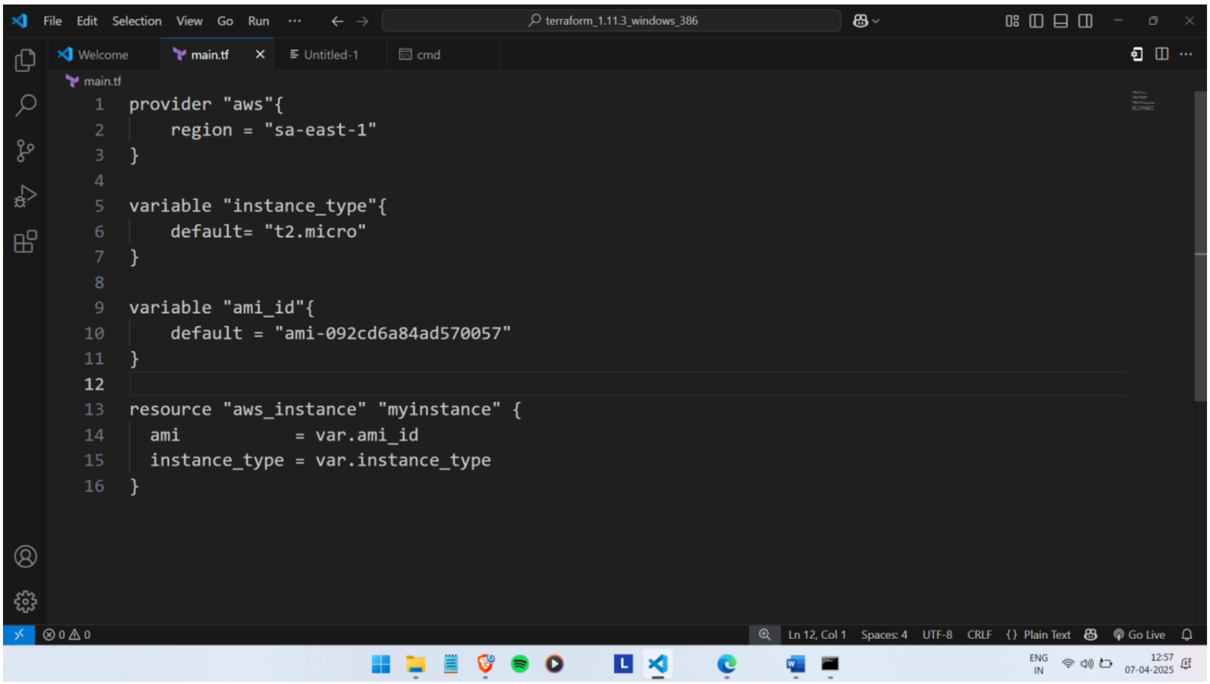
Firewall (security group)
New security group

Storage (volumes)
1 volume(s) - 8 GiB

Free tier: In your first year of opening an AWS account, you get 750 hours per month of t2.micro instance usage (or t3.micro where t2.micro isn't available) when used with free tier AMIs, 750 hours per month of public IPv4 address usage, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the

Amazon Machine Image (AMI)

4. Write terraform script :



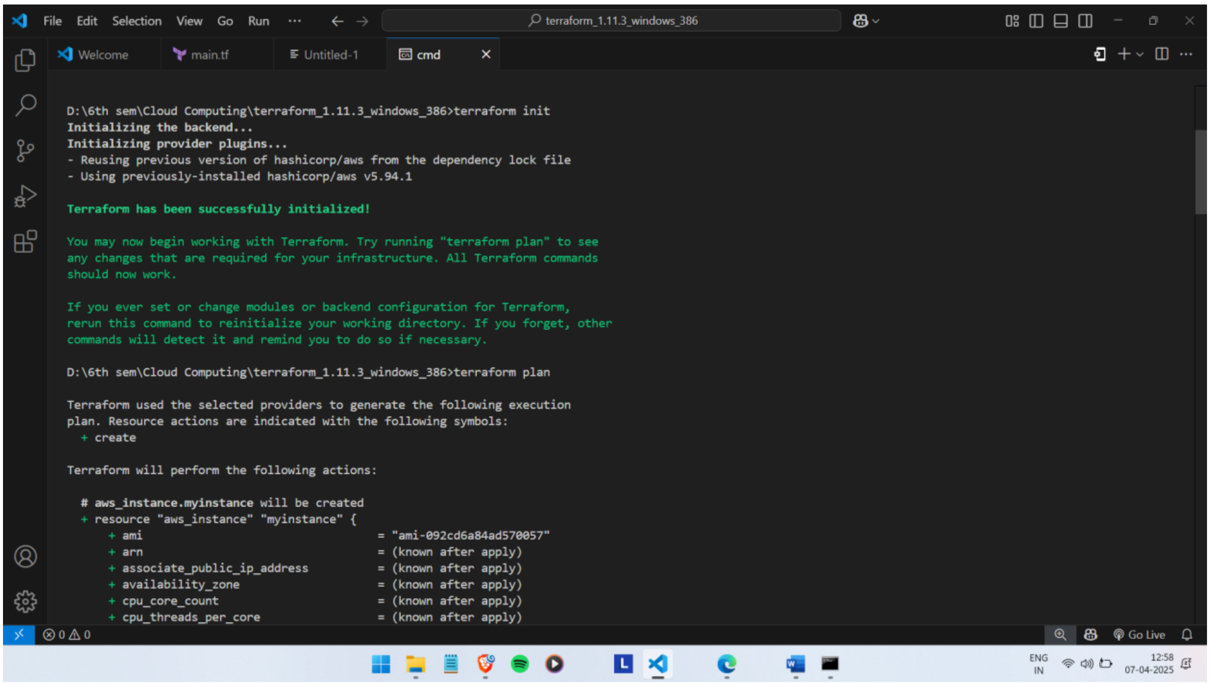
```
provider "aws"{
    region = "sa-east-1"
}

variable "instance_type"{
    default= "t2.micro"
}

variable "ami_id"{
    default = "ami-092cd6a84ad570057"
}

resource "aws_instance" "myinstance" {
  ami           = var.ami_id
  instance_type = var.instance_type
}
```

5. Run terraform commands

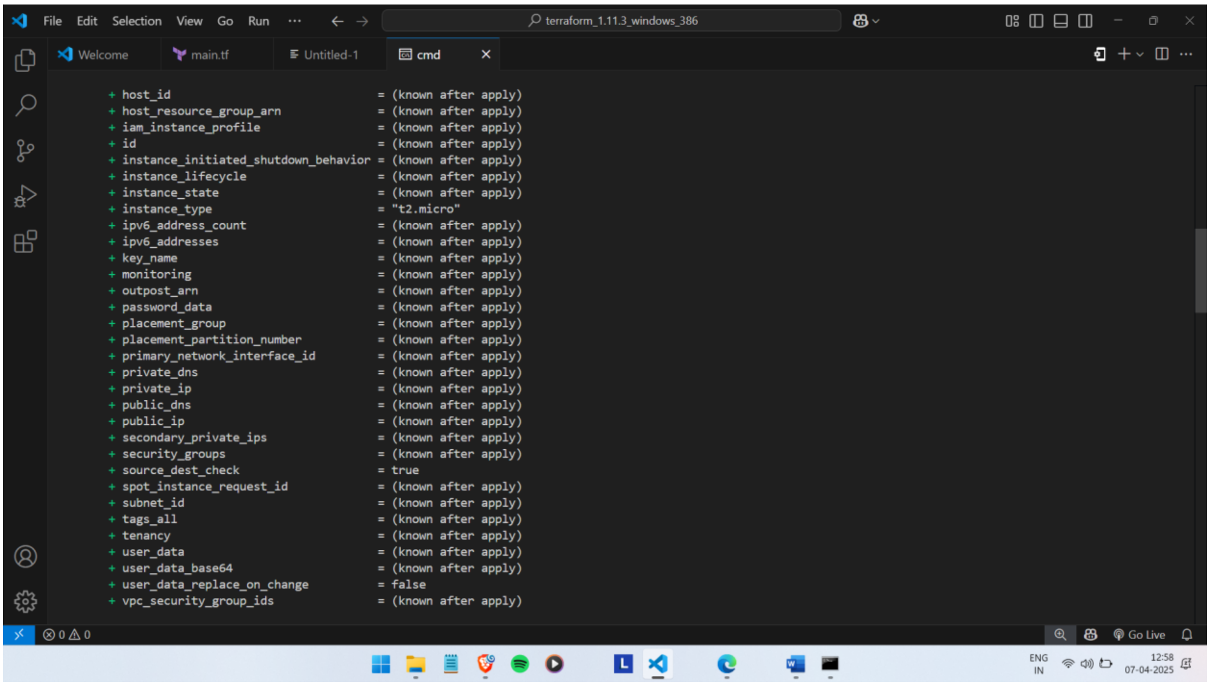
terraform init

terraform plan

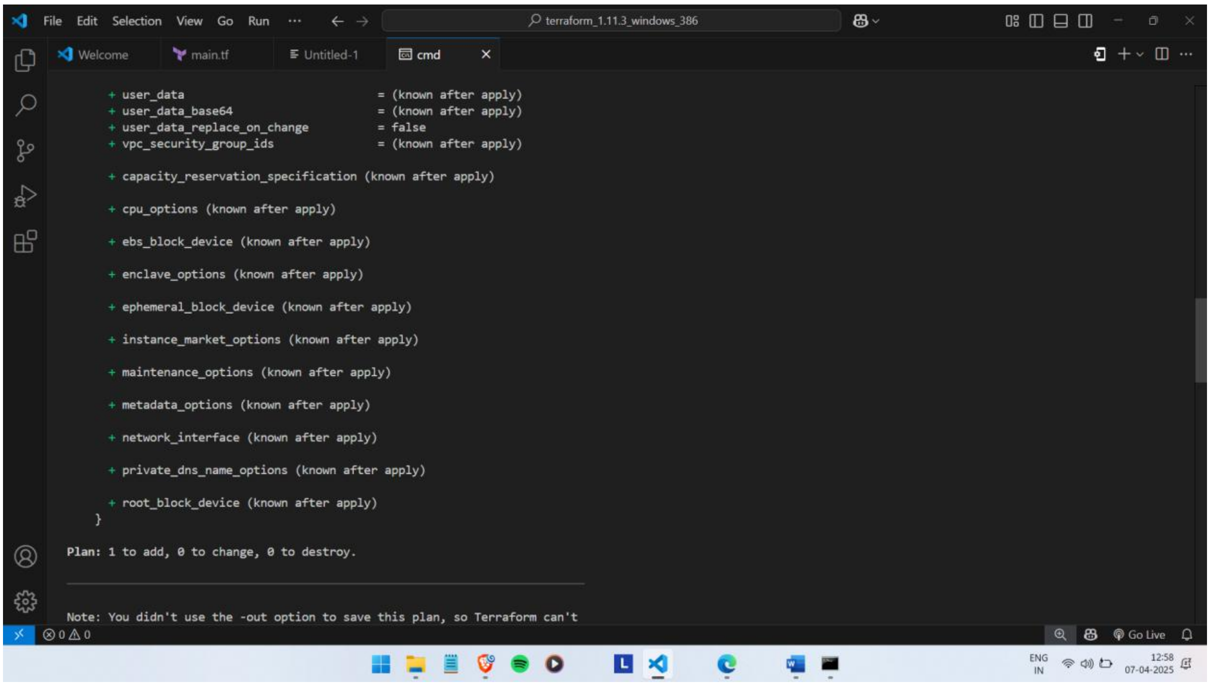
terraform apply



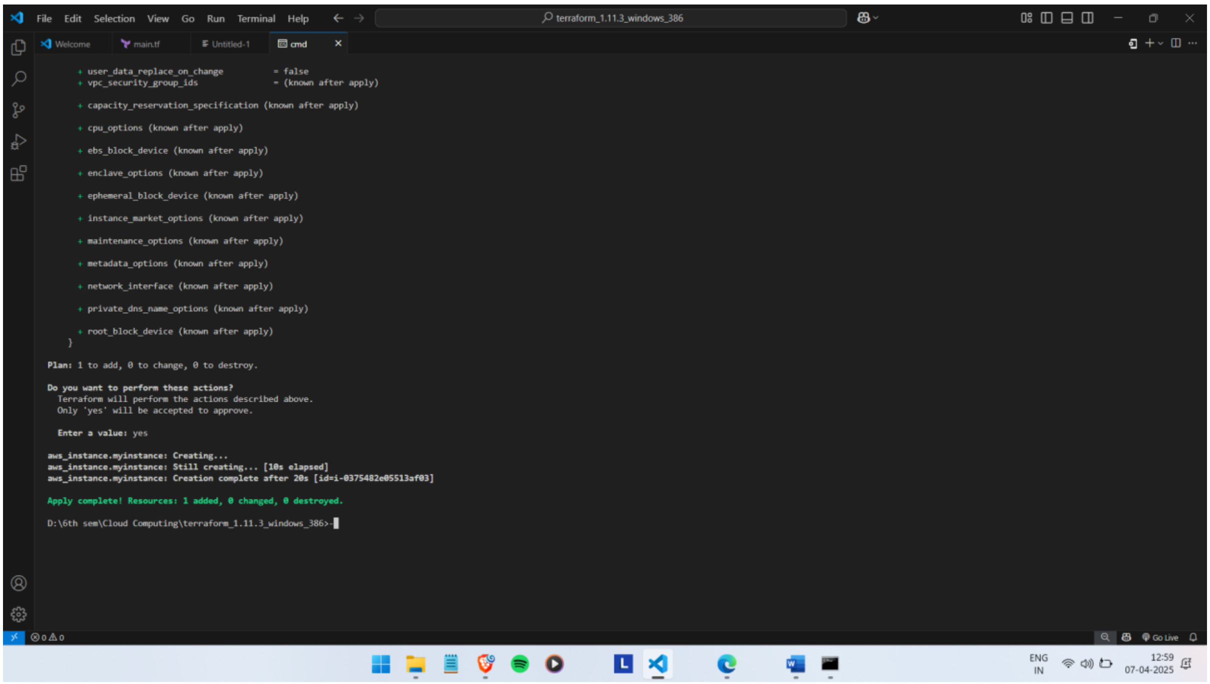
```
D:\6th sem\Cloud Computing\terraform_1.11.3_windows_386>terraform init
Initializing the backend...
Initializing provider plugins...
- Reusing previous version of hashicorp/aws from the dependency lock file
- Using previously-installed hashicorp/aws v5.94.1

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.

D:\6th sem\Cloud Computing\terraform_1.11.3_windows_386>terraform plan

Terraform used the selected providers to generate the following execution
plan. Resource actions are indicated with the following symbols:
  + create

Terraform will perform the following actions:

  # aws_instance.myinstance will be created
  + resource "aws_instance" "myinstance" {
      + ami                                  = "ami-092cd6a84ad570057"
      + arn                                  = (known after apply)
      + associate_public_ip_address          = (known after apply)
      + availability_zone                    = (known after apply)
      + cpu_core_count                       = (known after apply)
      + cpu_threads_per_core                 = (known after apply)
```



```
      + host_id                              = (known after apply)
      + host_resource_group_arn              = (known after apply)
      + iam_instance_profile                 = (known after apply)
      + id                                   = (known after apply)
      + instance_initiated_shutdown_behavior = (known after apply)
      + instance_lifecycle                   = (known after apply)
      + instance_state                       = (known after apply)
      + instance_type                        = "t2.micro"
      + ipv6_address_count                   = (known after apply)
      + ipv6_addresses                       = (known after apply)
      + key_name                             = (known after apply)
      + monitoring                           = (known after apply)
      + outpost_arn                          = (known after apply)
      + password_data                        = (known after apply)
      + placement_group                      = (known after apply)
      + placement_partition_number           = (known after apply)
      + primary_network_interface_id         = (known after apply)
      + private_dns                          = (known after apply)
      + private_ip                           = (known after apply)
      + public_dns                           = (known after apply)
      + public_ip                            = (known after apply)
      + secondary_private_ips                = (known after apply)
      + security_groups                      = (known after apply)
      + source_dest_check                    = true
      + spot_instance_request_id             = (known after apply)
      + subnet_id                            = (known after apply)
      + tags_all                             = (known after apply)
      + tenancy                              = (known after apply)
      + user_data                            = (known after apply)
      + user_data_base64                     = (known after apply)
      + user_data_replace_on_change          = false
      + vpc_security_group_ids               = (known after apply)
```

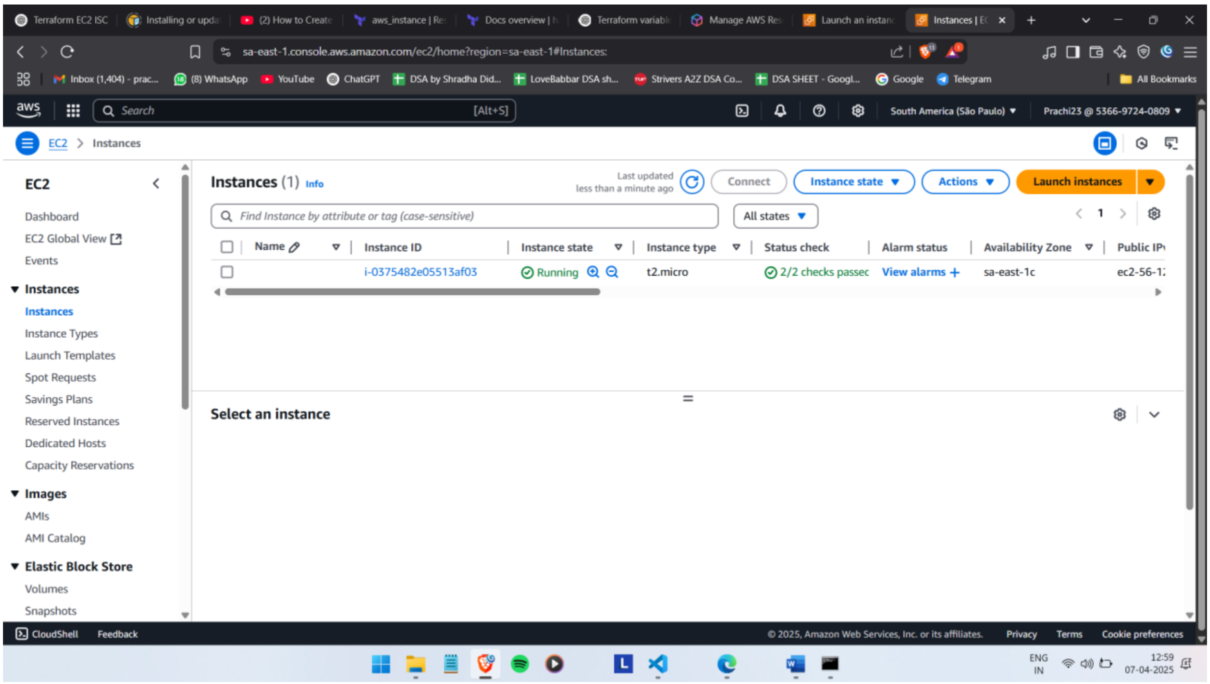


```
      + user_data                            = (known after apply)
      + user_data_base64                     = (known after apply)
      + user_data_replace_on_change          = false
      + vpc_security_group_ids               = (known after apply)

      + capacity_reservation_specification (known after apply)

      + cpu_options (known after apply)

      + ebs_block_device (known after apply)

      + enclave_options (known after apply)

      + ephemeral_block_device (known after apply)

      + instance_market_options (known after apply)

      + maintenance_options (known after apply)

      + metadata_options (known after apply)

      + network_interface (known after apply)

      + private_dns_name_options (known after apply)

      + root_block_device (known after apply)
    }

Plan: 1 to add, 0 to change, 0 to destroy.

─────────────────────────────────────────────────────────────────────────────

Note: You didn't use the -out option to save this plan, so Terraform can't
```



```
      + user_data_replace_on_change          = false
      + vpc_security_group_ids               = (known after apply)

      + capacity_reservation_specification (known after apply)

      + cpu_options (known after apply)

      + ebs_block_device (known after apply)

      + enclave_options (known after apply)

      + ephemeral_block_device (known after apply)

      + instance_market_options (known after apply)

      + maintenance_options (known after apply)

      + metadata_options (known after apply)

      + network_interface (known after apply)

      + private_dns_name_options (known after apply)

      + root_block_device (known after apply)
    }

Plan: 1 to add, 0 to change, 0 to destroy.

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_instance.myinstance: Creating...
aws_instance.myinstance: Still creating... [10s elapsed]
aws_instance.myinstance: Creation complete after 20s [id=i-0375482e05513af03]

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

D:\6th sem\Cloud Computing\terraform_1.11.3_windows_386>
```

Result:



sa-east-1.console.aws.amazon.com/ec2/home?region=sa-east-1#Instances:

EC2 > Instances

Instances (1) Info

Last updated less than a minute ago

Find Instance by attribute or tag (case-sensitive)

All states

☐	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IP
☐		i-0375482e05513af03	Running	t2.micro	2/2 checks passec	View alarms +	sa-east-1c	ec2-56-1:

Select an instance