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Division: D15C **Roll No: 28**

Aim: To Build, change, and destroy AWS / GCP /Microsoft Azure/ DigitalOcean infrastructure Using Terraform. (S3 bucket or Docker)fdp.

Terraform: Terraform is an open-source infrastructure as code (IaC) tool that allows you to define, provision, and manage cloud resources across various providers using a declarative configuration language. It enables consistent and repeatable infrastructure deployments, supports multi-cloud environments, and maintains state files to track resource changes. Terraform automates the creation and management of infrastructure, making it easier to scale and modify resources.

Prerequisites:

- Install Terraform .
- Install Vscode.
- Hashicrop extension in Vscode.
  AWS Academy Account

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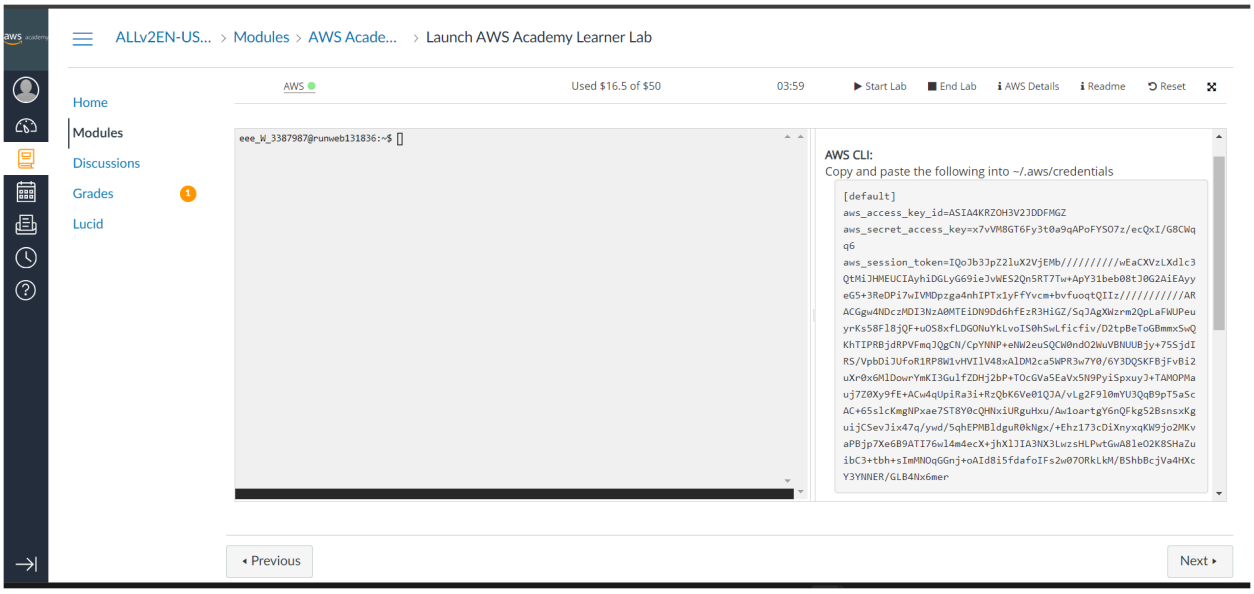
Step 1: Open your AWS Academy account . Then Start the lab from modules. After starting the lab click on the AWS details and click on show button after the AWS CLI to get Access keys and other details now copy full credientials.



Step 2: Now Create a folder Named As “Terraform Scripts “ and Open it on Vscode or any code editor. Now create one file Credietial.txt and paste the copied credentials 2 times .

```
aws_access_key_id=ASIA4KRZOH3V2JDDFMGZ
aws_secret_access_key=x7vVM8GT6Fy3t0a9qAPoFYSO7z/ecQxI/G8CWqq6
aws_session_token=IQoJb3JpZ2luX2VjEMb/////////wEaCXVzLXdlc3QtMiJHMEUCIAyhiDGLyG69ieJvWES2Qn5RT7Tw+ApY31beb08tJ0G2AiEAyyeG5
+3ReDPi7wIVMDpzga4nhIPTx1yFfYvcm+bvfuoqtQIIz//////////ARACGgw4NDczMDI3NzA0MTEiDN9Dd6hfEzR3HiGZ/SqJAgXWzrm2QpLaFWUPeuyrKs58Fl8jQF
+uOS8xfLDGONuYkLvoIS0hSwLficfiv/D2tpBeToGBmmxSwQKhTIPRBjdRPVFmqJQgCN/CpYNNP+eNW2euSQCW0ndO2WuVBNUUBjy+75SjdIRS/
VpbDiJUfoR1RP8W1vHVIlV48xAlDM2ca5WPR3w7Y0/6Y3DQSKFBjFvBi2uXr0x6MlDowrYmKI3GulfZDHj2bP+TOcGVa5EaVx5N9PyiSpxuyJ+TAMOPMauj7Z0Xy9fE+ACw4qUpiRa3i
+RzQbK6Ve01QJA/vLg2F9l0mYU3QqB9pT5aScAC+65slcKmgNPxae7ST8Y0cQHNxiURguHxu/Aw1oartgY6nQFkg52BsnsxKguijCSevJix47q/ywd/5qhEPMBldguR0kNgx/
+Ehz173cDiXnyxqKW9jo2MKvaPBjp7Xe6B9ATI76wl4m4ecX+jhXlJIA3NX3LwzsHLPwtGwA8leO2K8SHaZuibC3+tbh+sImMNOqGGnj+oAId8i5fdafoIFs2w07ORkLkM/
BShbBcjVa4HXcY3YNNER/GLB4Nx6mer
```


```
aws_access_key_id=ASIA4KRZOH3V2JDDFMGZ
aws_secret_access_key=x7vVM8GT6Fy3t0a9qAPoFYSO7z/ecQxI/G8CWqq6
aws_session_token=IQoJb3JpZ2luX2VjEMb/////////wEaCXVzLXdlc3QtMiJHMEUCIAyhiDGLyG69ieJvWES2Qn5RT7Tw+ApY31beb08tJ0G2AiEAyyeG5
+3ReDPi7wIVMDpzga4nhIPTx1yFfYvcm+bvfuoqtQIIz//////////ARACGgw4NDczMDI3NzA0MTEiDN9Dd6hfEzR3HiGZ/SqJAgXWzrm2QpLaFWUPeuyrKs58Fl8jQF
+uOS8xfLDGONuYkLvoIS0hSwLficfiv/D2tpBeToGBmmxSwQKhTIPRBjdRPVFmqJQgCN/CpYNNP+eNW2euSQCW0ndO2WuVBNUUBjy+75SjdIRS/
VpbDiJUfoR1RP8W1vHVIlV48xAlDM2ca5WPR3w7Y0/6Y3DQSKFBjFvBi2uXr0x6MlDowrYmKI3GulfZDHj2bP+TOcGVa5EaVx5N9PyiSpxuyJ+TAMOPMauj7Z0Xy9fE+ACw4qUpiRa3i
+RzQbK6Ve01QJA/vLg2F9l0mYU3QqB9pT5aScAC+65slcKmgNPxae7ST8Y0cQHNxiURguHxu/Aw1oartgY6nQFkg52BsnsxKguijCSevJix47q/ywd/5qhEPMBldguR0kNgx/
+Ehz173cDiXnyxqKW9jo2MKvaPBjp7Xe6B9ATI76wl4m4ecX+jhXlJIA3NX3LwzsHLPwtGwA8leO2K8SHaZuibC3+tbh+sImMNOqGGnj+oAId8i5fdafoIFs2w07ORkLkM/
BShbBcjVa4HXcY3YNNER/GLB4Nx6mer
```


Now Make RHS of both copied keys to upper case and put the LHS of 1st copied keys inside the Double quotes “”
And for 1st copied give prefix export and 2nd copied give prefix set.

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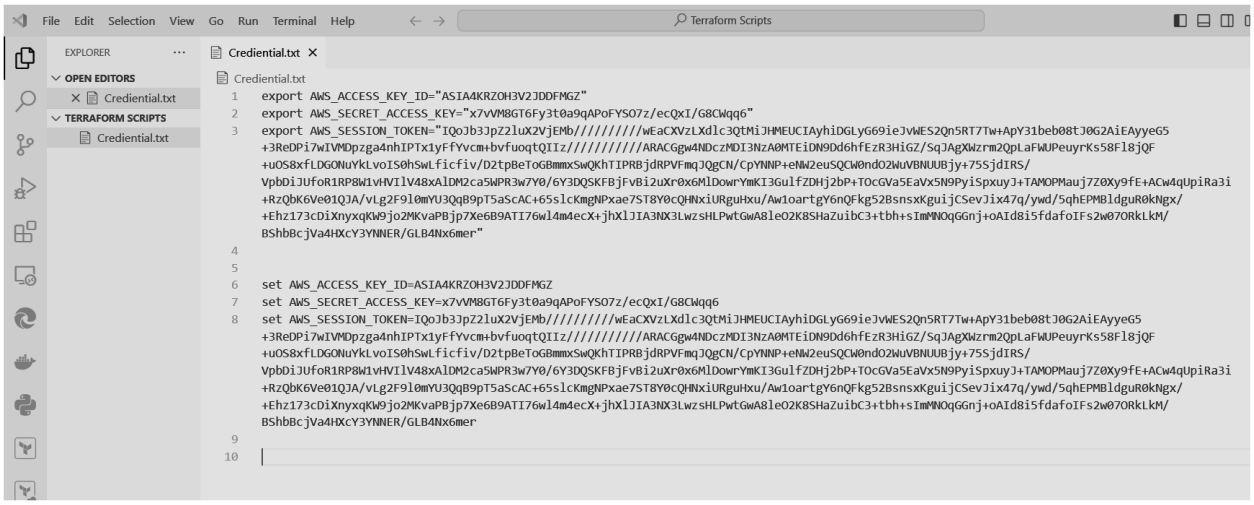
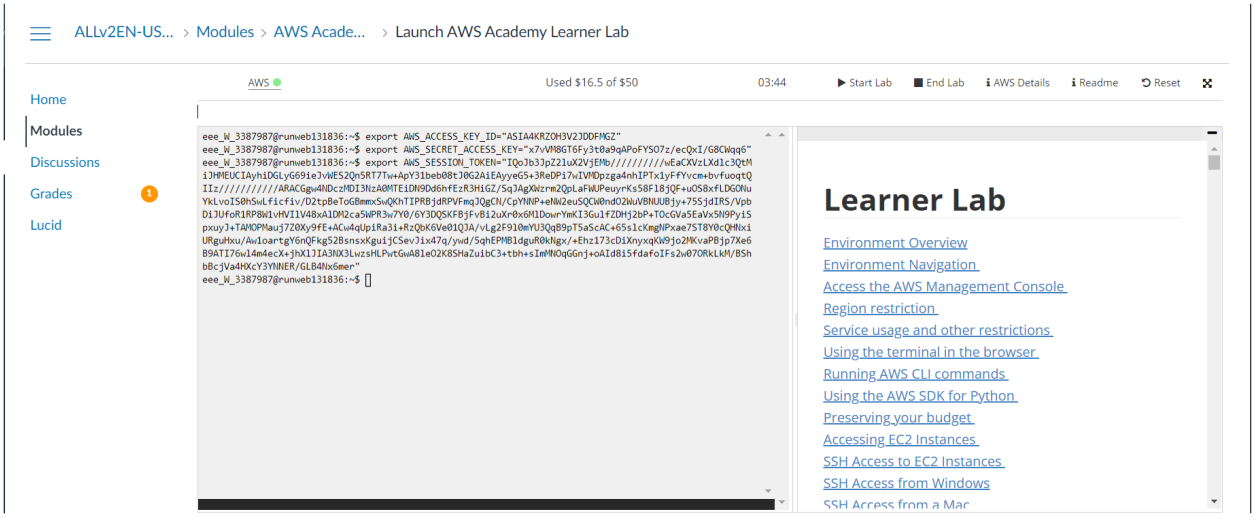
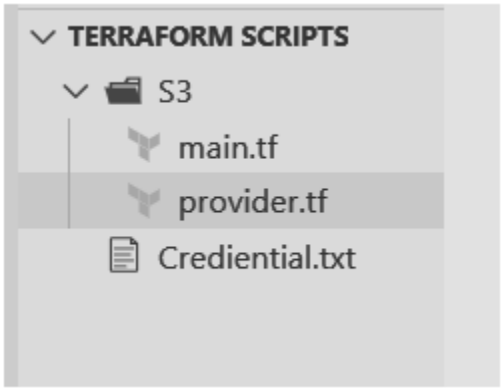


Step 3: Copy paste the 1st paragraph or 1st copied in learners lab terminal and hit enter.



Step 4: Now create S3 folder inside the same folder and create provider.tf and main.tf file in S3 folder.



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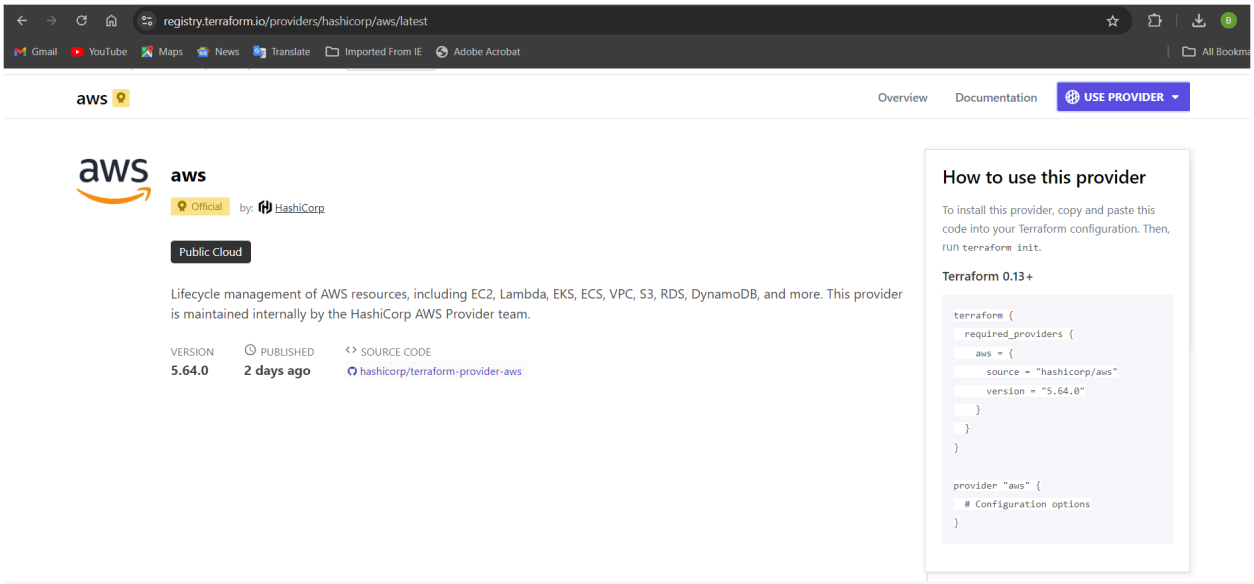
Step 5: In provider.tf add the following script and do not forget to add your key values and region inside the “ ” quotes all details you will get in AWS details in lab .

```
provider "aws" {
access_key=""
secret_key=""
token =""
region=""
}
```

Step 6 : Visit the website Terraform By Hashicrop go inside registry then click on Browse provider then click on or search AWS then click on use provider and copy the code exect provider part. Because provider part we have already cover.Paste the code in main.tf.



```
terraform {
  required_providers {
    aws = {
      source = "hashicorp/aws"
      version = "5.64.0"
    }
  }
}
```

Step 7: Now write the following code in main.tf to create the bucket.

```
resource "aws_s3_bucket" "any_name" {

  bucket = "Bucket_Name_It_sholud_be_Unique_and_all_in_lowercase_follow_Documentation"
  tags = {
    Name="Any_name"
  }
}
```

Crediential.txt provider.tf main.tf

S3 > main.tf > resource "aws_s3_bucket" "my-bucket-us-east-1" > bucket

```
terraform {
  required_providers {
    aws = {
      source = "hashicorp/aws"
      version = "5.64.0"
    }
  }
}

resource "aws_s3_bucket" "my-bucket-us-east-1" {

  bucket = "bhushan-kor-aws-bucket-terraform"
  tags = {
    Name="Sample Bucket"
  }
}
```

Step 8: Now open new terminal and cd to S3 And perform the following commands
1)terraform init
2)terraform plan
3)terraform apply

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE PORTS

```
Microsoft Windows [Version 10.0.22631.4037]
(c) Microsoft Corporation. All rights reserved.

C:\Users\bhush\one drive 2\OneDrive\Desktop\Terraform Scripts>cd S3
```

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```
C:\Users\bhush\one drive 2\OneDrive\Desktop\Terraform Scripts\S3>terraform init
Initializing the backend...
Initializing provider plugins...
- Finding hashicorp/aws versions matching "5.64.0"...
- Installing hashicorp/aws v5.64.0...
- Installed hashicorp/aws v5.64.0 (signed by HashiCorp)
Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.

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.
```

```
C:\Users\bhush\one drive 2\OneDrive\Desktop\Terraform Scripts\S3>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_s3_bucket.my-bucket-us-east-1 will be created
  + resource "aws_s3_bucket" "my-bucket-us-east-1" {
      + acceleration_status         = (known after apply)
      + acl                         = (known after apply)
      + arn                         = (known after apply)
      + bucket                      = "bhushan-Kor-aws-bucket-terraform"
      + bucket_domain_name          = (known after apply)
      + bucket_prefix               = (known after apply)
      + bucket_regional_domain_name = (known after apply)
      + force_destroy               = false
      + hosted_zone_id              = (known after apply)
      + id                          = (known after apply)
      + object_lock_enabled         = (known after apply)
      + policy                      = (known after apply)
      + region                      = (known after apply)
      + request_payer               = (known after apply)
      + tags                        = {
          + "Name" = "Sample Bucket"
        }
      + tags_all                    = {
          + "Name" = "Sample Bucket"
        }
      + website_domain              = (known after apply)
      + website_endpoint            = (known after apply)

      + cors_rule (known after apply)

      + grant (known after apply)

      + lifecycle_rule (known after apply)
```

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```
      + lifecycle_rule (known after apply)

      + logging (known after apply)

      + object_lock_configuration (known after apply)

      + replication_configuration (known after apply)

      + server_side_encryption_configuration (known after apply)

      + versioning (known after apply)

      + website (known after apply)
    }

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

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Note: You didn't use the -out option to save this plan, so Terraform can't guarantee to take exactly these actions if you run "terraform apply" now.
```

```
C:\Users\bhush\one drive 2\OneDrive\Desktop\Terraform Scripts\S3>terraform apply

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_s3_bucket.my-bucket-us-east-1 will be created
  + resource "aws_s3_bucket" "my-bucket-us-east-1" {
      + acceleration_status         = (known after apply)
      + acl                         = (known after apply)
      + arn                         = (known after apply)
      + bucket                      = "bhushan-kor-aws-bucket-terraform"
      + bucket_domain_name          = (known after apply)
      + bucket_prefix               = (known after apply)
      + bucket_regional_domain_name = (known after apply)
      + force_destroy               = false
      + hosted_zone_id              = (known after apply)
      + id                          = (known after apply)
      + object_lock_enabled         = (known after apply)
      + policy                      = (known after apply)
      + region                      = (known after apply)
      + request_payer               = (known after apply)
      + tags                        = {
          + "Name" = "Sample Bucket"
        }
      + tags_all                    = {
          + "Name" = "Sample Bucket"
        }
      + website_domain              = (known after apply)
      + website_endpoint            = (known after apply)

      + cors_rule (known after apply)

      + grant (known after apply)
```

```
      + cors_rule (known after apply)

      + grant (known after apply)

      + lifecycle_rule (known after apply)

      + logging (known after apply)

      + object_lock_configuration (known after apply)

      + replication_configuration (known after apply)

      + server_side_encryption_configuration (known after apply)

      + versioning (known after apply)

      + website (known after apply)
      + website (known after apply)
    }
      + website (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_s3_bucket.my-bucket-us-east-1: Creating...
aws_s3_bucket.my-bucket-us-east-1: Creation complete after 8s [id=bhushan-kor-aws-bucket-terraform]

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

      + website (known after apply)
    }
```

```
       + website (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_s3_bucket.my-bucket-us-east-1: Creating...
 aws_s3_bucket.my-bucket-us-east-1: Creation complete after 8s [id=bhushan-kor-aws-bucket-terraform]

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

 C:\Users\bhush\one drive 2\OneDrive\Desktop\Terraform Scripts\S3>
       + website (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_s3_bucket.my-bucket-us-east-1: Creating...
 aws_s3_bucket.my-bucket-us-east-1: Creation complete after 8s [id=bhushan-kor-aws-bucket-terraform]

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

 C:\Users\bhush\one drive 2\OneDrive\Desktop\Terraform Scripts\S3>


       + website (known after apply)
```

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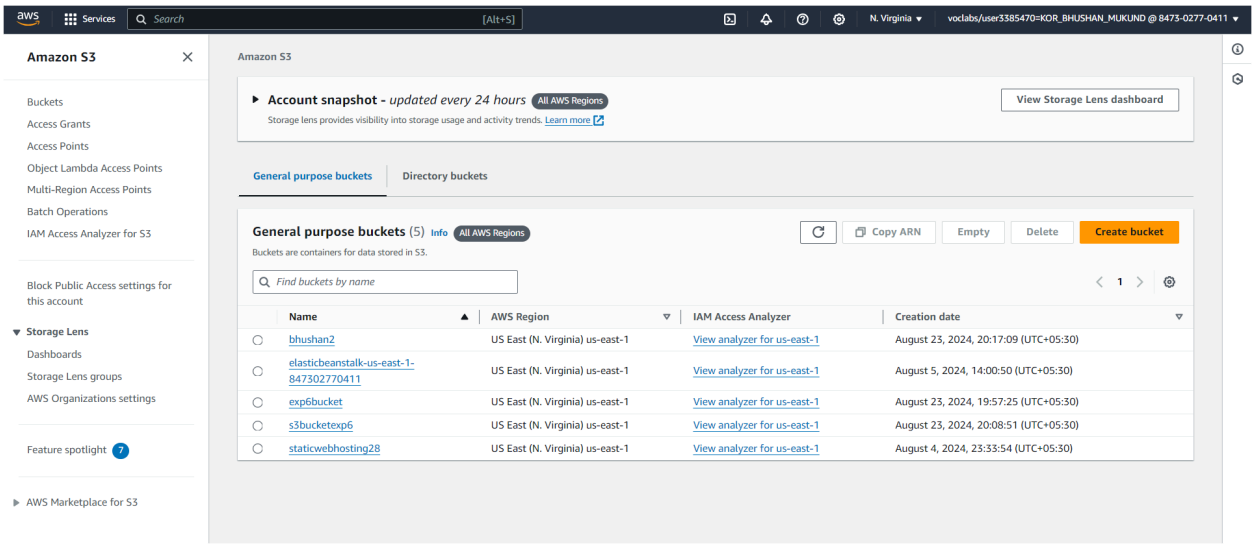
```
      + website (known after apply)
    }

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_s3_bucket.my-bucket-us-east-1: Creating...
aws_s3_bucket.my-bucket-us-east-1: Creation complete after 8s [id=bhushan-kor-aws-bucket-terraform]

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

C:\Users\bhush\one drive 2\OneDrive\Desktop\Terraform Scripts\S3>



    }

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_s3_bucket.my-bucket-us-east-1: Creating...
aws_s3_bucket.my-bucket-us-east-1: Creation complete after 8s [id=bhushan-kor-aws-bucket-terraform]

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

C:\Users\bhush\one drive 2\OneDrive\Desktop\Terraform Scripts\S3>
```

Now If you Click on AWS on lab it will open your AWS account and in S3 you can see you bucket.

Before terrafrom Apply:



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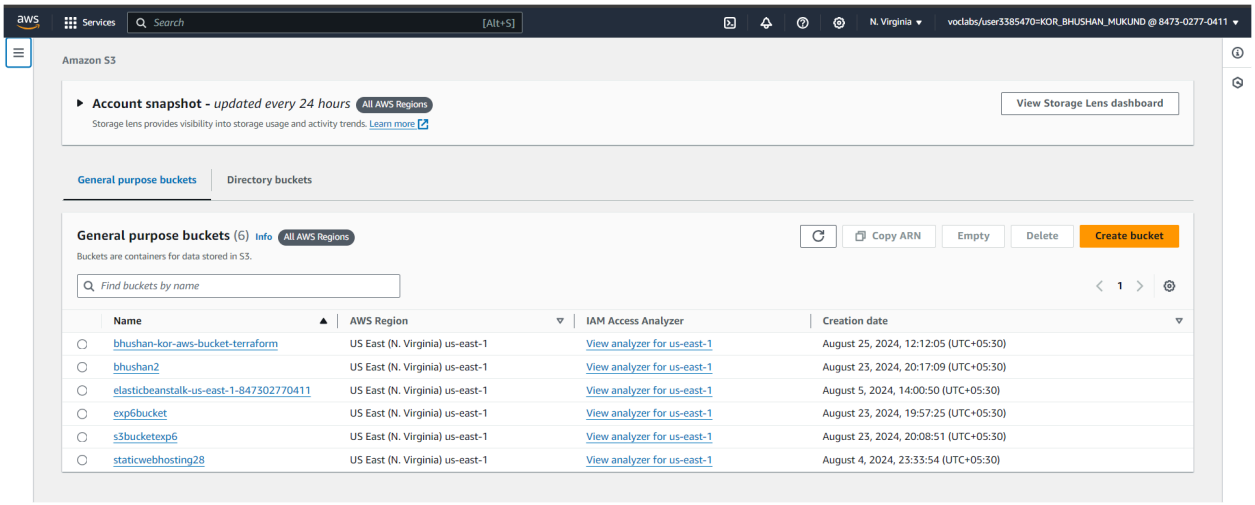
After terraform apply:



Step 9: Now to destroy the bucket run command terraform destroy.

```
C:\Users\bhush\one drive 2\OneDrive\Desktop\Terraform Scripts\S3>terraform destroy
aws_s3_bucket.my-bucket-us-east-1: Refreshing state... [id=bhushan-kor-aws-bucket-terraform]

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

Terraform will perform the following actions:

  # aws_s3_bucket.my-bucket-us-east-1 will be destroyed
  - resource "aws_s3_bucket" "my-bucket-us-east-1" {
      - arn                         = "arn:aws:s3:::bhushan-kor-aws-bucket-terraform" -> null
      - bucket                      = "bhushan-kor-aws-bucket-terraform" -> null
      - bucket_domain_name          = "bhushan-kor-aws-bucket-terraform.s3.amazonaws.com" -> null
      - bucket_regional_domain_name = "bhushan-kor-aws-bucket-terraform.s3.us-east-1.amazonaws.com" -> null
      - force_destroy               = false -> null
      - hosted_zone_id              = "Z3AQBSTGFYJSTF" -> null
      - id                          = "bhushan-kor-aws-bucket-terraform" -> null
      - object_lock_enabled         = false -> null
      - region                      = "us-east-1" -> null
      - request_payer               = "BucketOwner" -> null
      - tags                        = {
          - "Name" = "Sample Bucket"
        } -> null
      - tags_all                    = {
          - "Name" = "Sample Bucket"
        } -> null
        # (3 unchanged attributes hidden)

      - grant {
          - id          = "778043bd0e67860760caebd7a1a61d745d8798fa35ab31144e54d7003ee08ae8" -> null
          - permissions = [
              - "FULL_CONTROL",
            ] -> null
          - type        = "CanonicalUser" -> null
            # (1 unchanged attribute hidden)
        }
```

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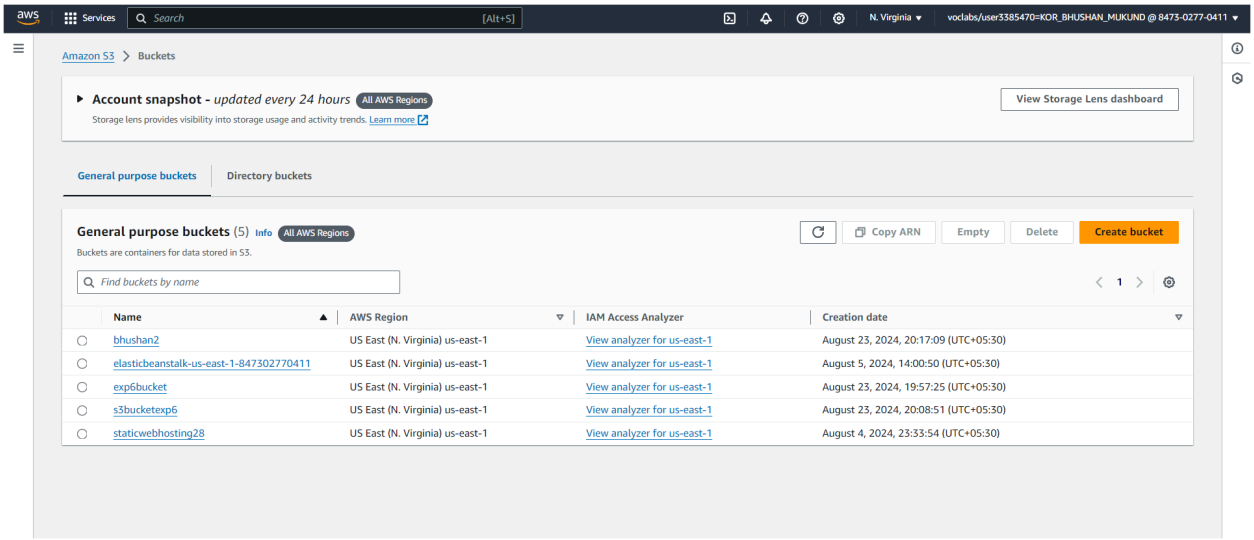
```
            - "FULL_CONTROL",
          ] -> null
        - type         = "CanonicalUser" -> null
          # (1 unchanged attribute hidden)
      }

    - server_side_encryption_configuration {
        - rule {
            - bucket_key_enabled = false -> null

            - apply_server_side_encryption_by_default {
                - sse_algorithm     = "AES256" -> null
                  # (1 unchanged attribute hidden)
              }
          }
      }

    - versioning {
        - enabled    = false -> null
        - mfa_delete = false -> null
      }
  }

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

Do you really want to destroy all resources?
  Terraform will destroy all your managed infrastructure, as shown above.
  There is no undo. Only 'yes' will be accepted to confirm.

  Enter a value: yes

aws_s3_bucket.my-bucket-us-east-1: Destroying... [id=bhushan-kor-aws-bucket-terraform]
aws_s3_bucket.my-bucket-us-east-1: Destruction complete after 2s

Destroy complete! Resources: 1 destroyed.

C:\Users\bhush\one drive 2\OneDrive\Desktop\Terraform Scripts\S3>
```

After terraform destroy :



Step 10: Congratulations we are done with creating and destroying the S3 bucket on AWS using Terraform.