School of Computer Science

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

DEHRADUN, UTTARAKHAND

System Monitoring & Configuration Management

Lab File

(2024-2025)

6th Semester

Submitted To:

Dr. Hitesh Kumar Sharma

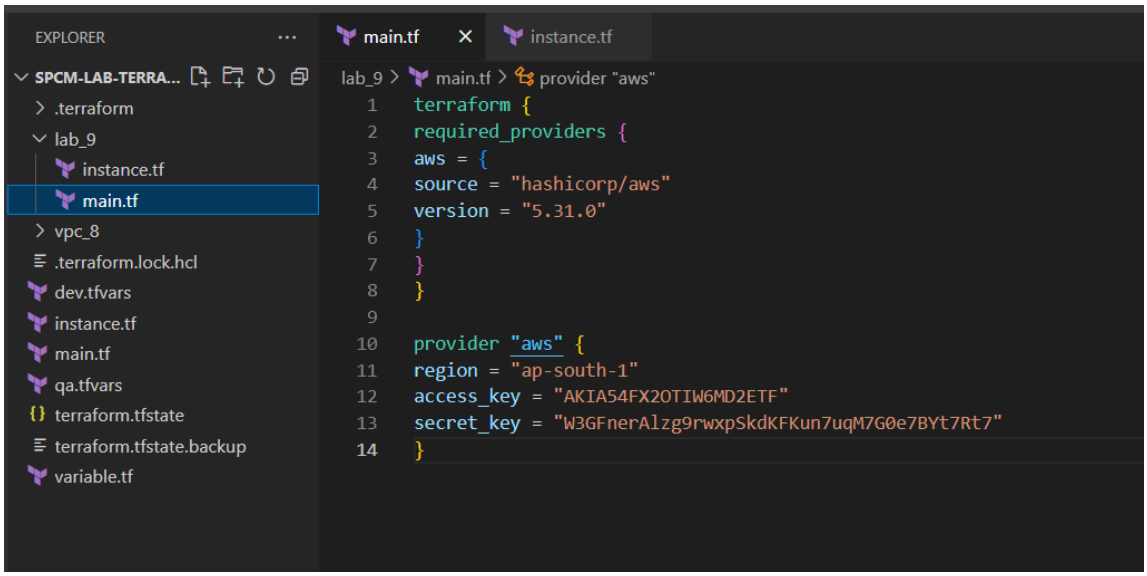
Submitted By:

Siddhi Jain
B. Tech. CSE DevOps
Sap id- 500090875
Batch 1
R2142210770

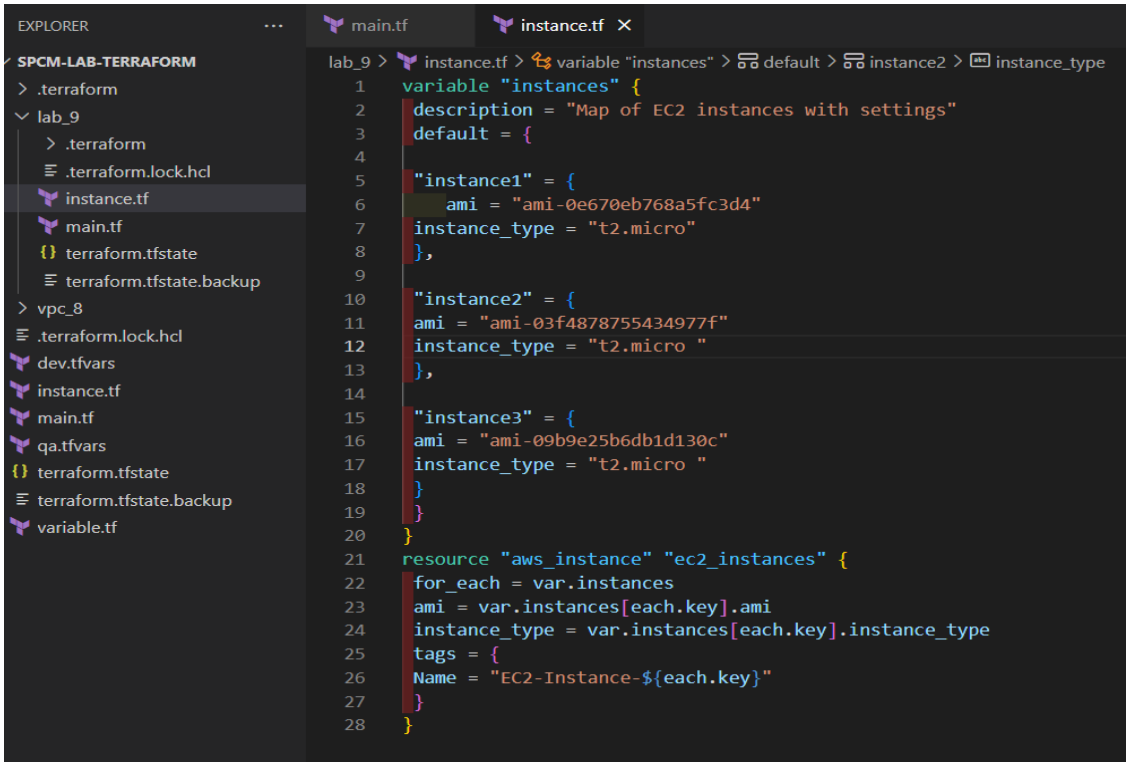
LAB EXERCISE 9

Aim: Creating Multiple EC2 Instances with for each in Terraform

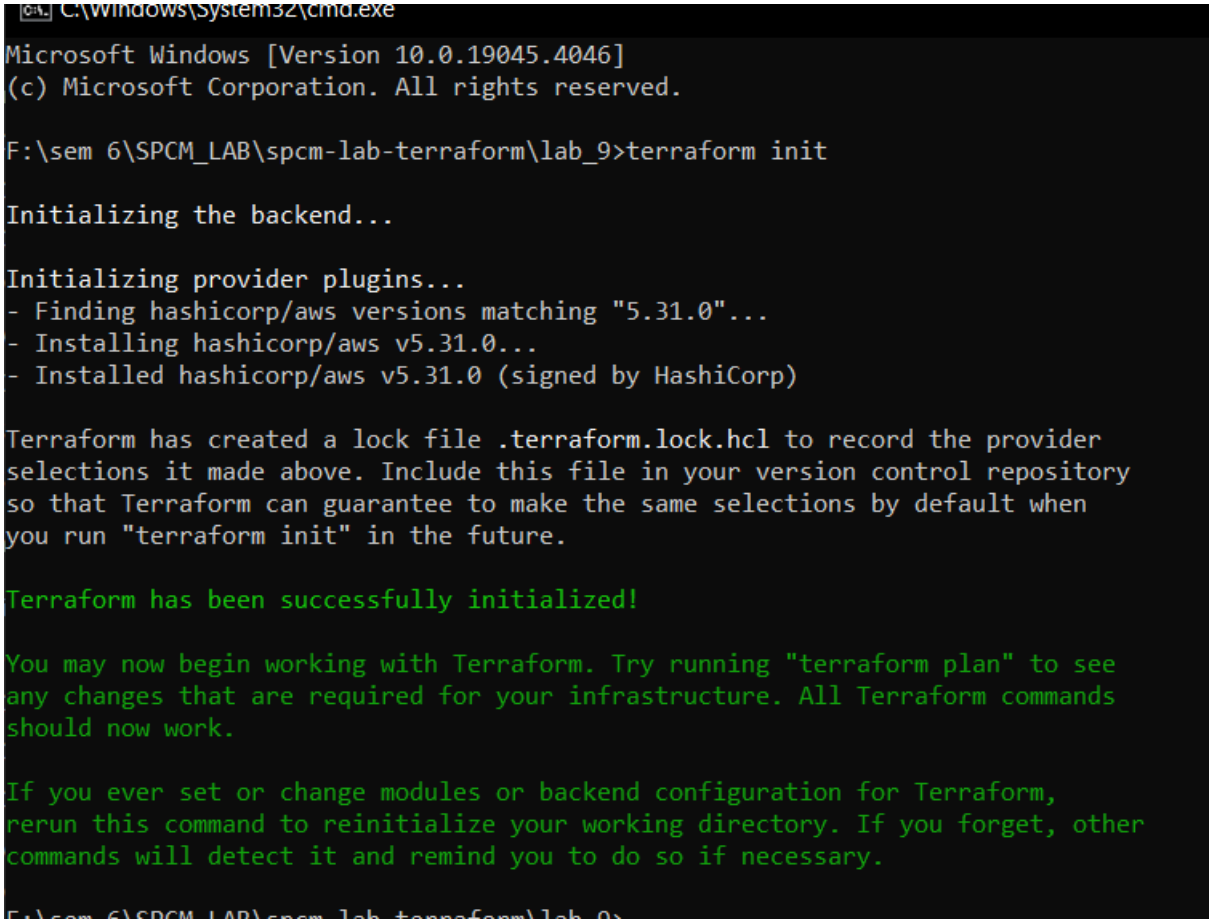
Step 1: Create a main.tf file



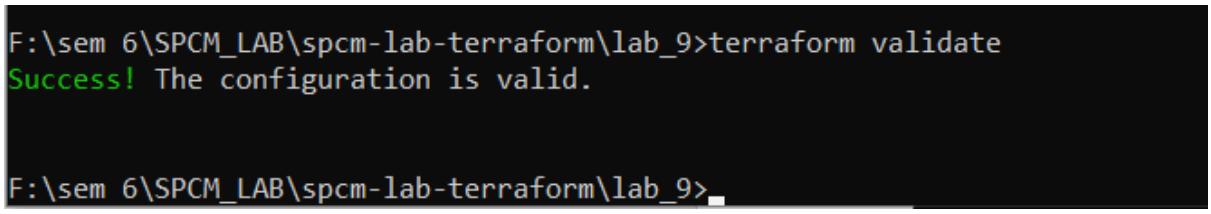
Step 2: Create a instance.tf file



Step 3: Now run terraform init command to Initialize.



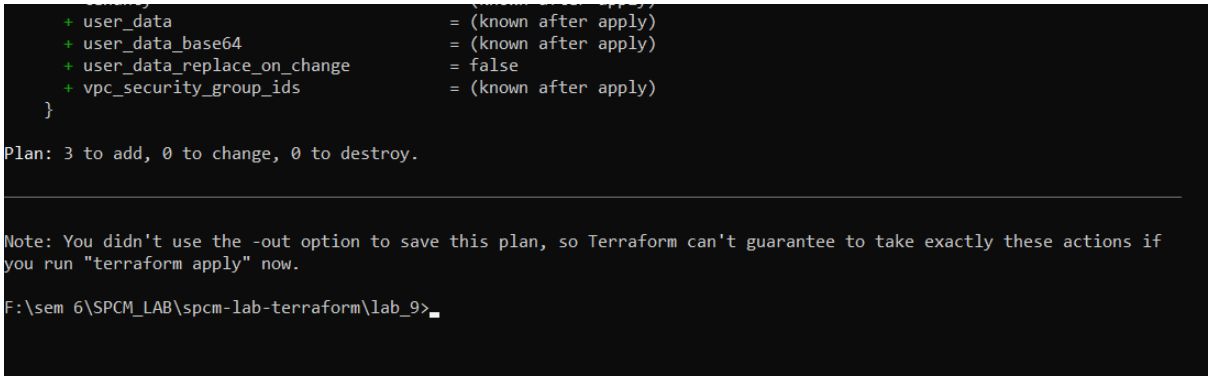
Step 4: Now run the terraform validate command to check if any error is present or not.



Step 5: Now run terraform plan command.

```
F:\sem 6\SPCM_LAB\spcm-lab-terraform\lab_9>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.ec2_instances["instance1"] will be created
  + resource "aws_instance" "ec2_instances" {
      + ami                                  = "ami-0e670eb768a5fc3d4"
      + 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)
      + disable_api_stop                     = (known after apply)
      + disable_api_termination              = (known after apply)
      + ebs_optimized                        = (known after apply)
      + get_password_data                    = false
      + 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                                 = {
```

```
C:\Windows\System32\cmd.exe
      + subnet_id                                  = (known after apply)
      + tags                                       = {
          + "Name" = "EC2-Instance-instance1"
        }
      + tags_all                                   = {
          + "Name" = "EC2-Instance-instance1"
        }
      + 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)
    }

  # aws_instance.ec2_instances["instance2"] will be created
  + resource "aws_instance" "ec2_instances" {
      + ami                                  = "ami-03f4878755434977f"
      + 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)
      + disable_api_stop                     = (known after apply)
      + disable_api_termination              = (known after apply)
      + ebs_optimized                        = (known after apply)
      + get_password_data                    = false
      + 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
```

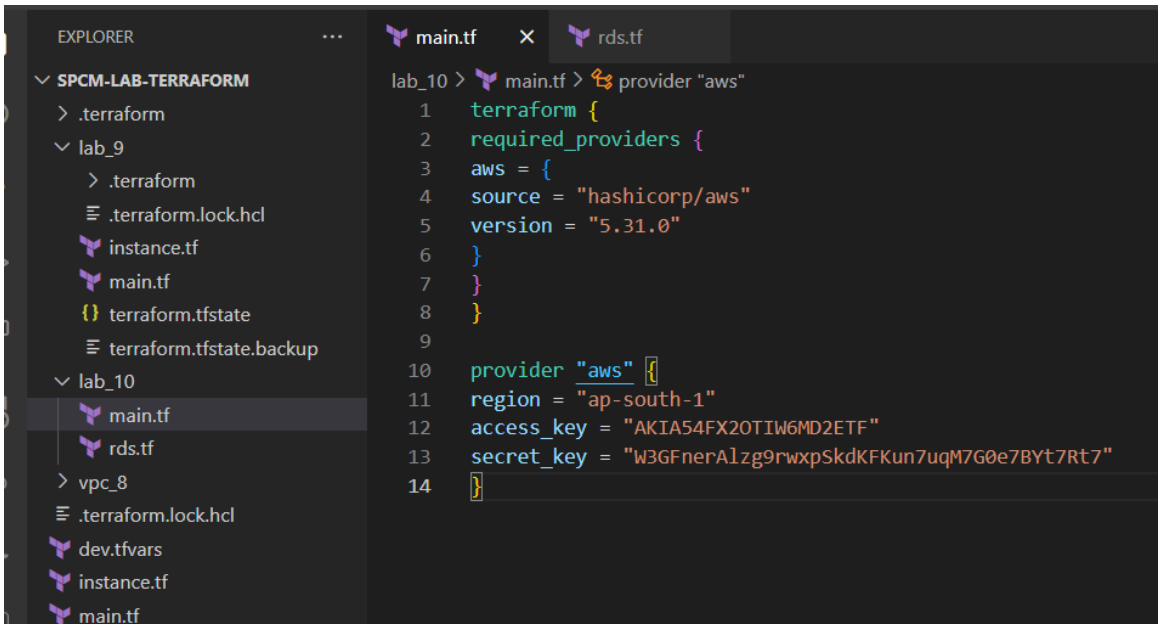


****END OF EXPERIMENT-09****

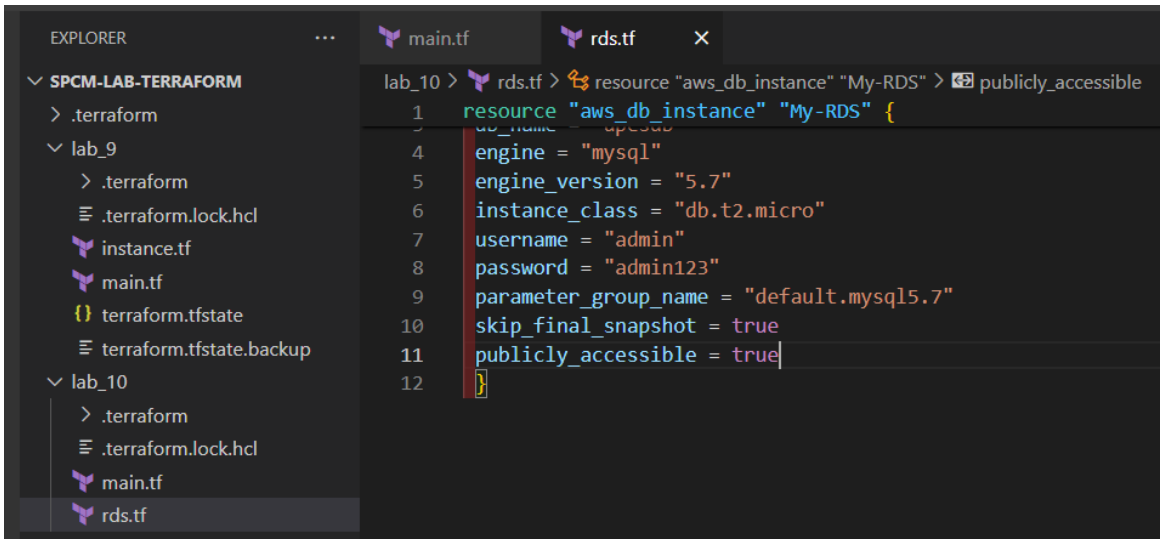
LAB EXERCISE 10

Aim: Creating an AWS RDS Instance in Terraform

Step 1: Create a main.tf file



Step 2: Create a rds.tf file



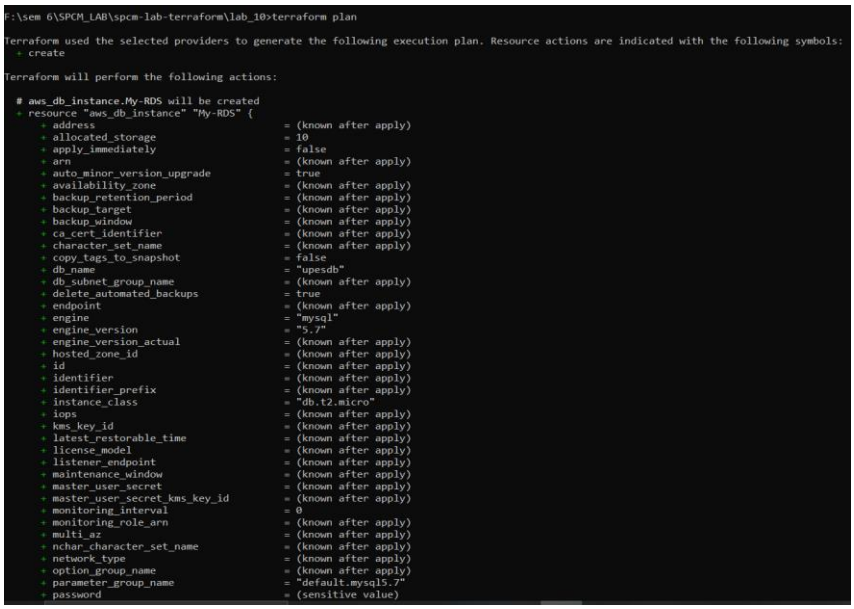
Step 3: Now run terraform init command to Initialize.

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19045.4046]
(c) Microsoft Corporation. All rights reserved.

F:\sem 6\SPCM_LAB\spcm-lab-terraform\lab_10>terraform init

Initializing the backend...

Initializing provider plugins...
- Finding hashicorp/aws versions matching "5.31.0"...
- Installing hashicorp/aws v5.31.0...
- Installed hashicorp/aws v5.31.0 (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.

F:\sem 6\SPCM_LAB\spcm-lab-terraform\lab_10>
```

Step 4: Now run the terraform validate command to check if any error is present or not.

```
F:\sem 6\SPCM_LAB\spcm-lab-terraform\lab_10>terraform validate
Success! The configuration is valid.


F:\sem 6\SPCM_LAB\spcm-lab-terraform\lab_10>
```

Step 5: Now run terraform plan command.



```
F:\sem 6\SPCM_LAB\spcm-lab-terraform\lab_10>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_db_instance.My-RDS will be created
  + resource "aws_db_instance" "My-RDS" {
      + address                               = (known after apply)
      + allocated_storage                     = 10
      + apply_immediately                     = false
      + arn                                   = (known after apply)
      + auto_minor_version_upgrade            = true
      + availability_zone                     = (known after apply)
      + backup_retention_period               = (known after apply)
      + backup_target                         = (known after apply)
      + backup_window                         = (known after apply)
      + ca_cert_identifier                    = (known after apply)
      + character_set_name                    = (known after apply)
      + copy_tags_to_snapshot                 = false
      + db_name                               = "upesdb"
      + db_subnet_group_name                  = (known after apply)
      + delete_automated_backups              = true
      + endpoint                              = (known after apply)
      + engine                                = "mysql"
      + engine_version                        = "5.7"
      + engine_version_actual                 = (known after apply)
      + hosted_zone_id                        = (known after apply)
      + id                                    = (known after apply)
      + identifier                            = (known after apply)
      + identifier_prefix                     = (known after apply)
      + instance_class                        = "db.t2.micro"
      + iops                                  = (known after apply)
      + kms_key_id                            = (known after apply)
      + latest_restorable_time                = (known after apply)
      + license_model                         = (known after apply)
      + listener_endpoint                     = (known after apply)
      + maintenance_window                    = (known after apply)
      + master_user_secret                    = (known after apply)
      + master_user_secret_kms_key_id         = (known after apply)
      + monitoring_interval                   = 0
      + monitoring_role_arn                   = (known after apply)
      + multi_az                              = (known after apply)
      + nchar_character_set_name              = (known after apply)
      + network_type                          = (known after apply)
      + option_group_name                     = (known after apply)
      + parameter_group_name                  = "default.mysql5.7"
      + password                              = (sensitive value)
```

```
      + performance_insights_enabled           = false
      + performance_insights_kms_key_id        = (known after apply)
      + performance_insights_retention_period  = (known after apply)
      + port                                   = (known after apply)
      + publicly_accessible                    = true
      + replica_mode                           = (known after apply)
      + replicas                               = (known after apply)
      + resource_id                            = (known after apply)
      + skip_final_snapshot                    = true
      + snapshot_identifier                    = (known after apply)
      + status                                 = (known after apply)
      + storage_throughput                     = (known after apply)
      + storage_type                           = (known after apply)
      + tags_all                               = (known after apply)
      + timezone                               = (known after apply)
      + username                               = "admin"
      + vpc_security_group_ids                 = (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 c

F:\sem 6\SPCM_LAB\spcm-lab-terraform\lab_10>
```

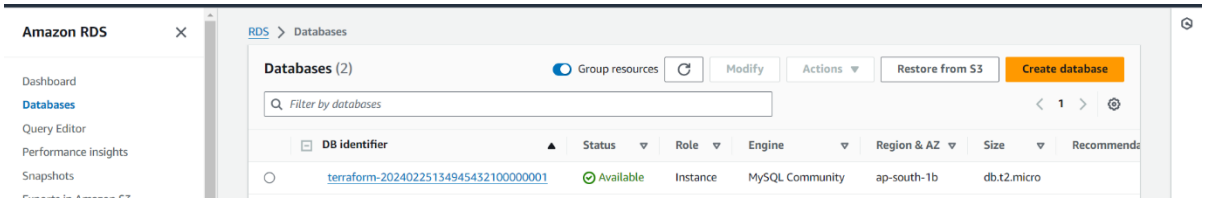
Step 6: Now run the terraform apply command to apply the rds.

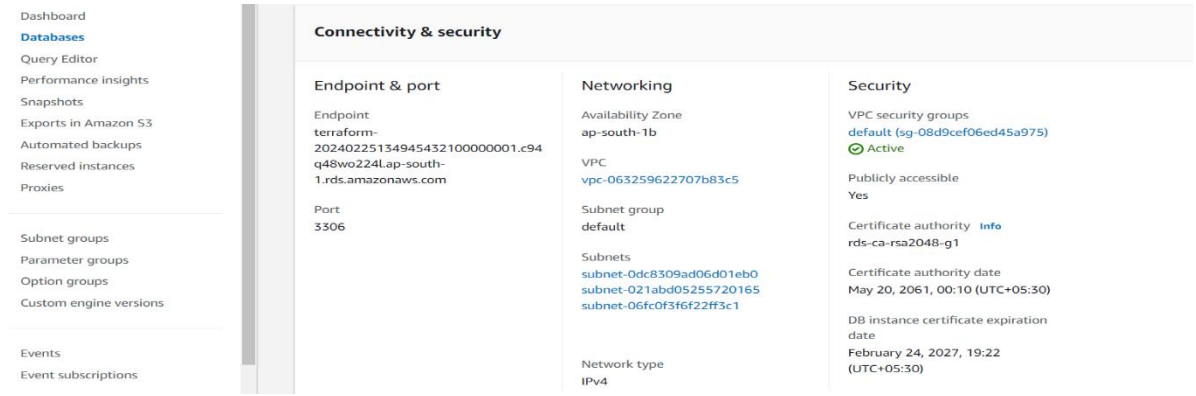
```
F:\sem 6\SPCM_LAB\spcm-lab-terraform\lab_10>terraform apply

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_db_instance.My-RDS will be created
  + resource "aws_db_instance" "My-RDS" {
      + address                               = (known after apply)
      + allocated_storage                     = 10
      + apply_immediately                     = false
      + arn                                   = (known after apply)
      + auto_minor_version_upgrade            = true
      + availability_zone                     = (known after apply)
      + backup_retention_period               = (known after apply)
      + backup_target                         = (known after apply)
      + backup_window                         = (known after apply)
      + ca_cert_identifier                    = (known after apply)
      + character_set_name                    = (known after apply)
      + copy_tags_to_snapshot                 = false
      + db_name                               = "upesdb"
      + db_subnet_group_name                  = (known after apply)
      + delete_automated_backups              = true
      + endpoint                              = (known after apply)
      + engine                                = "mysql"
      + engine_version                        = "5.7"
      + engine_version_actual                 = (known after apply)
      + hosted_zone_id                        = (known after apply)
      + id                                    = (known after apply)
      + identifier                            = (known after apply)
      + identifier_prefix                     = (known after apply)
      + instance_class                        = "db.t2.micro"
      + iops                                  = (known after apply)
      + kms_key_id                            = (known after apply)
      + latest_restorable_time                = (known after apply)
      + license_model                         = (known after apply)
      + listener_endpoint                     = (known after apply)
      + maintenance_window                    = (known after apply)
      + master_user_secret                    = (known after apply)
      + master_user_secret_kms_key_id         = (known after apply)
      + monitoring_interval                   = 0
      + monitoring_role_arn                   = (known after apply)
      + multi_az                              = (known after apply)
      + nchar_character_set_name              = (known after apply)
      + network_type                          = (known after apply)
```

```
C:\Windows\System32\cmd.exe
      + network_type                            = (known after apply)
      + option_group_name                       = (known after apply)
      + parameter_group_name                    = "default.mysql5.7"
      + password                                = (sensitive value)
      + performance_insights_enabled            = false
      + performance_insights_kms_key_id         = (known after apply)
      + performance_insights_retention_period   = (known after apply)
      + port                                    = (known after apply)
      + publicly_accessible                     = true
      + replica_mode                            = (known after apply)
      + replicas                                = (known after apply)
      + resource_id                             = (known after apply)
      + skip_final_snapshot                     = true
      + snapshot_identifier                     = (known after apply)
      + status                                  = (known after apply)
      + storage_throughput                      = (known after apply)
      + storage_type                            = (known after apply)
      + tags_all                                = (known after apply)
      + timezone                                = (known after apply)
      + username                                = "admin"
      + vpc_security_group_ids                  = (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
```

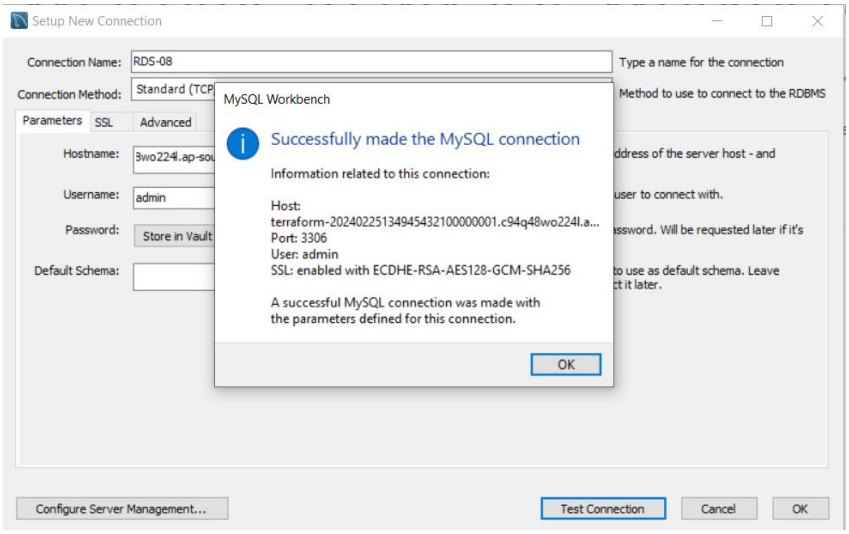
```
aws_db_instance.My-RDS: Creating...
aws_db_instance.My-RDS: Still creating... [10s elapsed]
aws_db_instance.My-RDS: Still creating... [20s elapsed]
aws_db_instance.My-RDS: Still creating... [30s elapsed]
aws_db_instance.My-RDS: Still creating... [40s elapsed]
aws_db_instance.My-RDS: Still creating... [50s elapsed]
aws_db_instance.My-RDS: Still creating... [1m0s elapsed]
aws_db_instance.My-RDS: Still creating... [1m10s elapsed]
aws_db_instance.My-RDS: Still creating... [1m20s elapsed]
aws_db_instance.My-RDS: Still creating... [1m30s elapsed]
aws_db_instance.My-RDS: Still creating... [1m40s elapsed]
aws_db_instance.My-RDS: Still creating... [1m51s elapsed]
aws_db_instance.My-RDS: Still creating... [2m1s elapsed]
aws_db_instance.My-RDS: Still creating... [2m11s elapsed]
aws_db_instance.My-RDS: Still creating... [2m21s elapsed]
aws_db_instance.My-RDS: Still creating... [2m31s elapsed]
aws_db_instance.My-RDS: Still creating... [2m41s elapsed]
aws_db_instance.My-RDS: Still creating... [2m51s elapsed]
aws_db_instance.My-RDS: Still creating... [3m1s elapsed]
aws_db_instance.My-RDS: Still creating... [3m11s elapsed]
aws_db_instance.My-RDS: Still creating... [3m21s elapsed]
aws_db_instance.My-RDS: Still creating... [3m31s elapsed]
aws_db_instance.My-RDS: Still creating... [3m41s elapsed]
aws_db_instance.My-RDS: Still creating... [3m51s elapsed]
aws_db_instance.My-RDS: Still creating... [4m1s elapsed]
aws_db_instance.My-RDS: Still creating... [4m11s elapsed]
aws_db_instance.My-RDS: Still creating... [4m21s elapsed]
aws_db_instance.My-RDS: Creation complete after 4m29s [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI]

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

F:\sem 6\SPCM_LAB\spcm-lab-terraform\lab_10>
```

Step 7: Verify the RDS Instance in AWS Console.





Step 8: Connect To MYSQL Workbench.

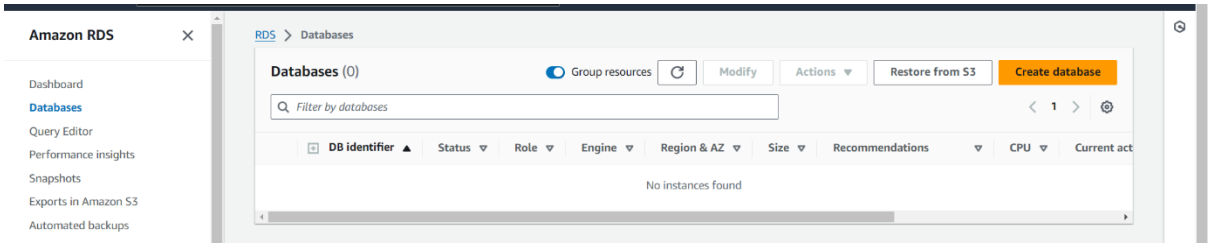


Step 9: Now Destroying the rds created.

```
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_db_instance.My-RDS will be destroyed
  - resource "aws_db_instance" "My-RDS" {
      - address                               = "terraform-20240225134945432100000001.c94q48wo224l.ap-south-1.rds.amazonaws.com" -> null
      - allocated_storage                     = 10 -> null
      - apply_immediately                     = false -> null
      - arn                                   = "arn:aws:rds:ap-south-1:953868252369:db:terraform-20240225134945432100000001" -> null
      - auto_minor_version_upgrade            = true -> null
      - availability_zone                     = "ap-south-1b" -> null
      - backup_retention_period               = 0 -> null
      - backup_target                         = "region" -> null
      - backup_window                         = "20:38-21:08" -> null
      - ca_cert_identifier                    = "rds-ca-rsa2048-g1" -> null
      - copy_tags_to_snapshot                 = false -> null
      - customer_owned_ip_enabled             = false -> null
      - db_name                               = "upesdb" -> null
      - db_subnet_group_name                  = "default" -> null
      - delete_automated_backups              = true -> null
      - deletion_protection                   = false -> null
      - enabled_cloudwatch_logs_exports       = [] -> null
      - endpoint                              = "terraform-20240225134945432100000001.c94q48wo224l.ap-south-1.rds.amazonaws.com:3306" -> null
      - engine                                = "mysql" -> null
      - engine_version                        = "5.7" -> null
      - engine_version_actual                 = "5.7.44" -> null
      - hosted_zone_id                        = "Z2VFMSZA74J7XZ" -> null
      - iam_database_authentication_enabled   = false -> null
      - id                                    = "db-ZBR2QLPZLUVOIW2F2RX2ULG3GI" -> null
      - identifier                            = "terraform-20240225134945432100000001" -> null
      - identifier_prefix                     = "terraform-" -> null
      - instance_class                        = "db.t2.micro" -> null
      - iops                                  = 0 -> null
      - license_model                         = "general-public-license" -> null
      - listener_endpoint                     = [] -> null
      - maintenance_window                    = "tue:12:23-tue:12:53" -> null
      - master_user_secret                    = [] -> null
      - max_allocated_storage                 = 0 -> null
      - monitoring_interval                   = 0 -> null
      - multi_az                              = false -> null
      - network_type                          = "IPV4" -> null
      - option_group_name                     = "default:mysql-5-7" -> null
      - parameter_group_name                  = "default.mysql5.7" -> null
      - password                              = (sensitive value) -> null
      - performance_insights_enabled          = false -> null
```

```
C:\Windows\System32\cmd.exe
      - performance_insights_retention_period = 0 -> null
      - port                                  = 3306 -> null
      - publicly_accessible                   = true -> null
      - replicas                              = [] -> null
      - resource_id                           = "db-ZBR2QLPZLUVOIW2F2RX2ULG3GI" -> null
      - skip_final_snapshot                   = true -> null
      - status                                = "available" -> null
      - storage_encrypted                     = false -> null
      - storage_throughput                    = 0 -> null
      - storage_type                          = "gp2" -> null
      - tags                                  = {} -> null
      - tags_all                              = {} -> null
      - username                              = "admin" -> null
      - vpc_security_group_ids                = [
          - "sg-08d9cef06ed45a975",
        ] -> 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
```

```
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_db_instance.My-RDS: Destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 10s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 20s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 30s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 40s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 50s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 1m0s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 1m10s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 1m20s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 1m30s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 1m40s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 1m50s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 2m0s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 2m10s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 2m20s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 2m30s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 2m40s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 2m50s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 3m0s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 3m10s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 3m20s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 3m30s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 3m40s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 3m50s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 4m0s elapsed]
aws_db_instance.My-RDS: Still destroying... [id=db-ZBR2QLPZLUVOIW2F2RX2ULG3GI, 4m10s elapsed]
aws_db_instance.My-RDS: Destruction complete after 4m14s

Destroy complete! Resources: 1 destroyed.

F:\sem 6\SPCM_LAB\spcm-lab-terraform\lab_10>
```



****END OF EXPERIMENT-10****