Experiment -7

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Semester: 6th **Date of Performance:13/03/25**
Subject Name: Foundation of Cloud IOT Edge ML **Subject Code: 22CSP-367**

1. **Aim:** Deploy and manage an edge computing environment using Terraform for running real-time IoT workloads close to data sources.

2. **Objective**: To deploy and manage an edge computing environment using Terraform for running real-time IoT workloads close to data sources.

3. **Prerequisites:** Terraform, AWS CLI, Cloud Platform - AWS S3

4. **Procedure:**
   i. **Log in to AWS:**
   Go to the AWS Management Console and log in with your credentials.
   ii. **Open Security Credentials from profile:**
   Here, create an access key
   iii. **Copy Access key and secret access key:**
   Download .csv file and copy from there.
   iv. **Download AWS CLI – Command Line Interface:**
   Select 64-bit Windows version and download it. Then install it.
   v. **Download terraform by HashiCorp:**
   Select AMD64 and download binary file for windows. Then extract it.
   vi. **Open Command prompt – type aws configure:**
   Enter copied access key and secret access key. Else none.
   vii. **Copy terraform file path and paste in environment variable:**
   Copy the path and paste it in PATH in Environment Variables.
   viii. **Check by opening cmd – terraform -v:**
   Verify using this command – terraform -v
   ix. **Open Project file in VS code :**
   Type ‘main.tf’ and insert the code from https://github.com/terraform-aws-modules/terraform-aws-s3-bucket#
   x. **Make a index.html file and upload it to AWS bucket**
   xi. **Copy the project path and open command prompt:**
   Change directory to project folder.
   xii. **Type terraform init:** Initialize Terraform
   xiii. **Type terraform plan:** Plan Deployment
   xiv. **Type terraform apply -auto-approve:** Deploy Infrastructure
   xv. **Open the AWS website endpoint link on browser.**
   xvi. **Type terraform destroy -auto-approve:** Destroy Infrastructure

5. Screenshot:

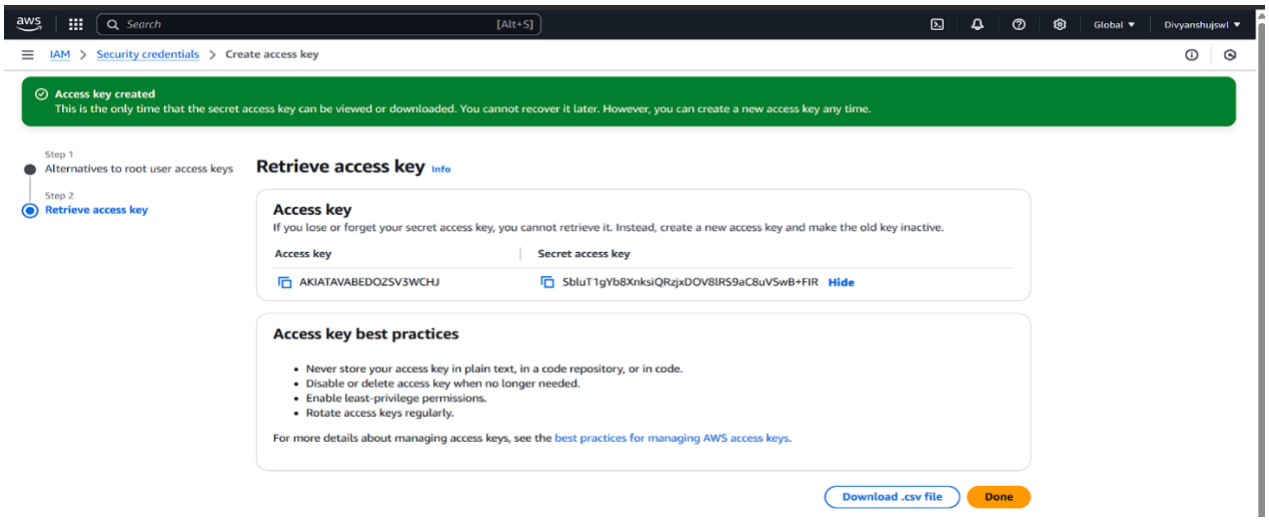


Fig. 1 Retrieve Access key

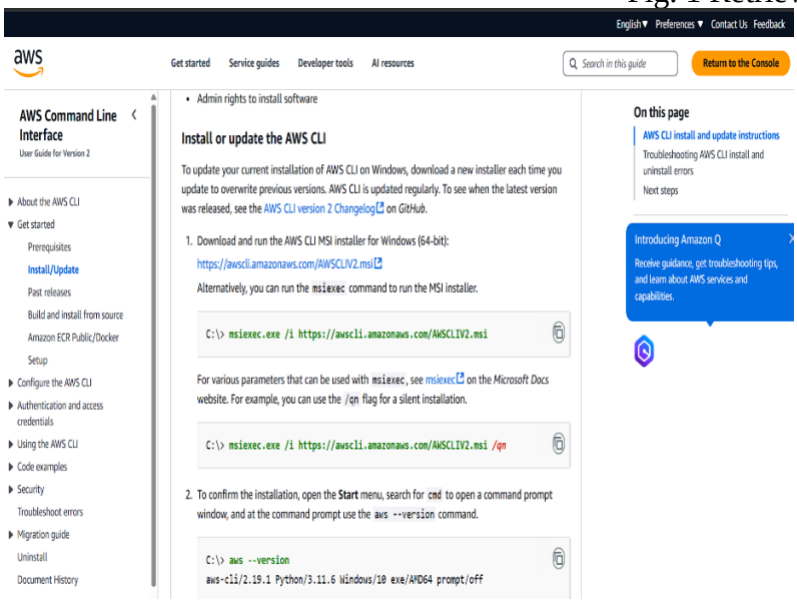


Fig. 2 Install AWS CLI

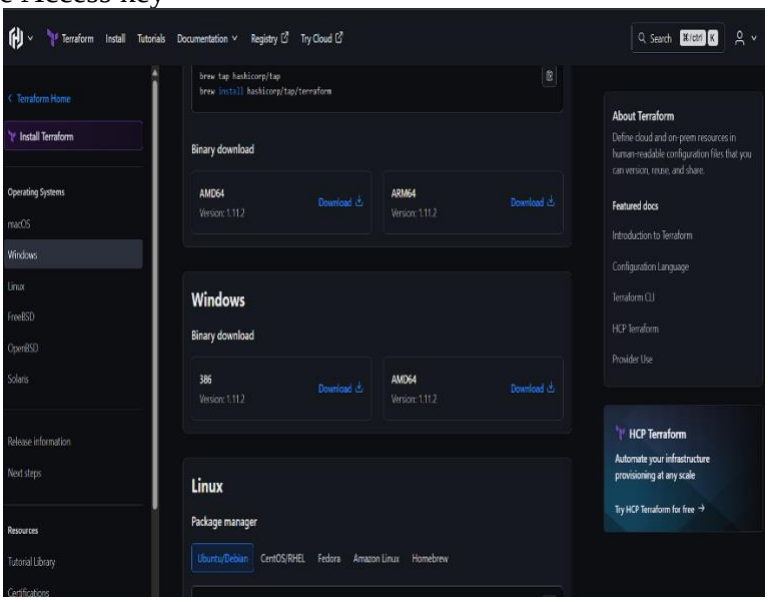


Fig. 3 Install Terraform

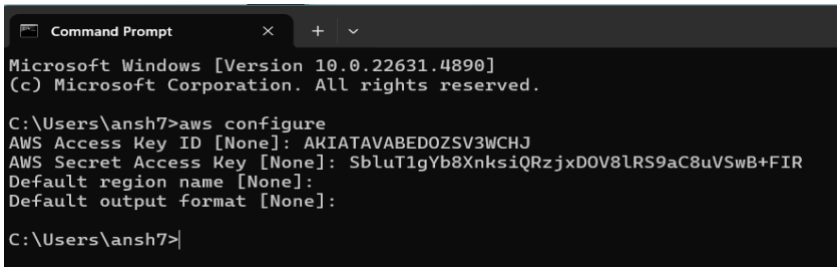


Fig. 4 Configure AWS

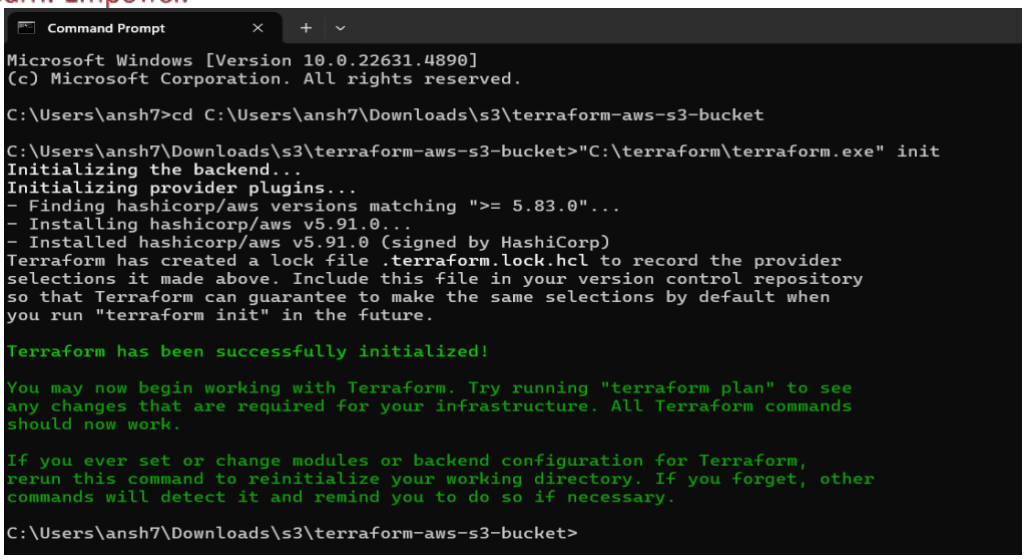


Fig. 5 type 'terraform init'

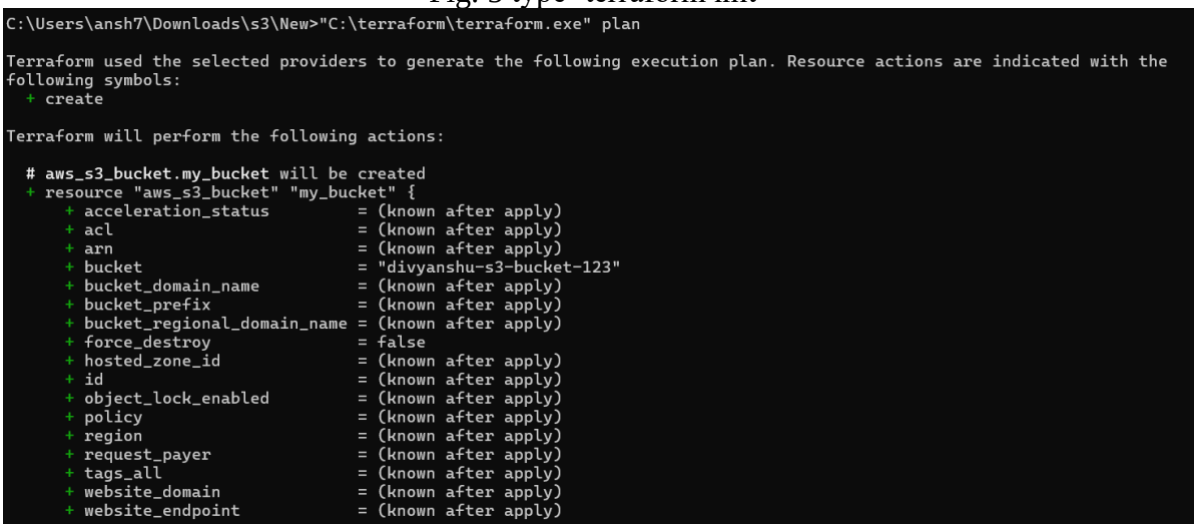


Fig. 6 type 'terraform plan'

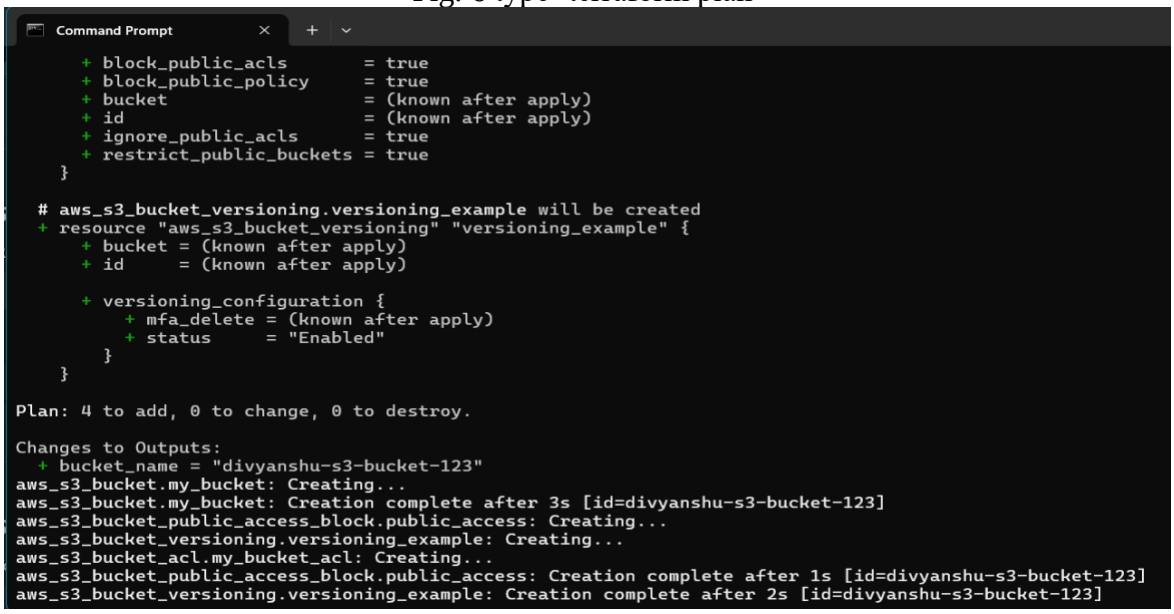
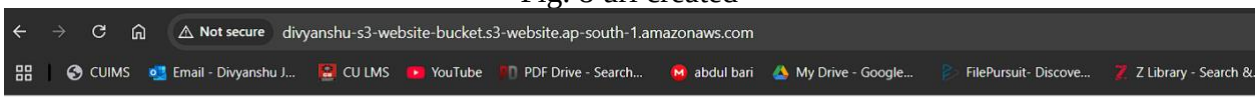


Fig. 7 type 'terraform -auto-approve'

```
Plan: 4 to add, 0 to change, 0 to destroy.

Changes to Outputs:
  + website_url = (known after apply)
aws_s3_bucket.my_bucket: Creating...
aws_s3_bucket.my_bucket: Creation complete after 5s [id=divyanshu-s3-website-bucket]
aws_s3_bucket_public_access_block.public_access: Creating...
aws_s3_bucket_policy.public_read: Creating...
aws_s3_bucket_website_configuration.website: Creating...
aws_s3_bucket_public_access_block.public_access: Creation complete after 1s [id=divyanshu-s3-website-bucket]
aws_s3_bucket_website_configuration.website: Creation complete after 1s [id=divyanshu-s3-website-bucket]
aws_s3_bucket_policy.public_read: Creation complete after 1s [id=divyanshu-s3-website-bucket]

Apply complete! Resources: 4 added, 0 changed, 0 destroyed.

Outputs:

website_url = "divyanshu-s3-website-bucket.s3-website.ap-south-1.amazonaws.com"

C:\Users\ansh7\Downloads\s3\New>
```

Fig. 8 url created



Terraform S3 Bucket for Static Website Deployment

Project Overview

In this project, we use Terraform to provision an S3 bucket on AWS to host a static website. This S3 bucket will serve as the origin for our website content.

How to Use

1. Ensure you have Terraform installed on your system. If not, download and install it from `https://developer.hashicorp.com/terraform/downloads`.
2. Clone this repository to your local machine.
3. Navigate to the directory containing the Terraform configuration files.
4. Run `terraform init` to initialize the working directory.
5. Run `terraform plan` to see the execution plan.
6. Run `terraform apply` to apply the changes and create the S3 bucket.

Terraform Configuration

Below is a simplified version of the Terraform configuration (`main.tf`) used to create the S3 bucket:

```
resource "aws_s3_bucket" "cc-bucket" {
    bucket = var.bucketname
}
```

Fig. 9 online website

6. Output

1. Define Terraform configuration (main.tf) to set up edge computing instances.
2. Deploy with Terraform (init, plan, apply).
3. Automate management with Terraform modules.
4. Monitor and scale edge nodes dynamically.

7. Learning Outcomes:

1. Understand Edge Computing: Its benefits in reducing latency and improving real-time IoT processing.
2. Learn Terraform Basics: How to define infrastructure using code and automate deployment.
3. Implement Cloud Infrastructure: Deploy virtual machines and configure security settings.
4. Use Terraform Commands: init, plan, and apply to set up infrastructure.