Lab 1 – Introduction to Terraform on AWS

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Learning Objectives

- Understand what Terraform is and why it is used.
- Learn the concept of Infrastructure as Code (IaC).
- Install Terraform and verify the installation.
- Set up AWS credentials for Terraform.
- Write your first Terraform configuration.
- Deploy your first AWS resource using Terraform.

Learning Outcome

By the end of this lab, the learner will be able to: - Explain Terraform in simple terms. - Describe the core components of Terraform (Providers, Resources, State). - Configure Terraform on their local machine. - Deploy an AWS resource (S3 bucket) using Terraform. - Understand how the `init`, `plan`, and `apply` workflow operates.

Concept Explanation (Natural Style)

Let’s understand Terraform in a very simple, beginner-friendly way.

Imagine you're working in a company where you need to set up servers, storage, networks, and databases. Traditionally, you would log in to AWS Console and manually click, click, click everywhere. That approach works but becomes painful when: - You have many environments (Dev, QA, Prod). - You need consistent setups. - You must recreate the same infrastructure again and again. - You want version control of your infrastructure.

So Terraform comes into the picture like a smart assistant. Instead of manually creating everything, you **write your infrastructure in simple code**. This is called **Infrastructure as Code (IaC)**.

Terraform reads this code and creates everything on AWS automatically.

Think of it like: - You write a shopping list. - Terraform goes to AWS and buys everything exactly as written.

No confusion, no missing configurations, no mistakes.

Lab Prerequisites

- AWS account (with IAM user having programmatic access)
- AWS CLI installed
- Terraform installed
- A code editor (VS Code recommended)

Step-by-Step Hands-On Lab

Step 1: Install Terraform

1. Go to https://developer.hashicorp.com/terraform/downloads
2. Download Terraform for your OS.
3. Install it normally.
4. Verify installation:

```
terraform -version
```

If you see a version, you are good to go!

Step 2: Configure AWS CLI

Before Terraform talks to AWS, your machine must be authenticated.

Run the following command:

```
aws configure
```

Enter: - AWS Access Key - AWS Secret Access Key - Default region (example: ap-south-1) - Output format: json

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Step 3: Create Your Terraform Project Folder

1. Create a folder:

```
mkdir terraform-lab1
cd terraform-lab1
```

2. Create your main configuration file:

```
touch main.tf
```

Step 4: Write Your First Terraform Code

Open `main.tf` and paste the following:

```
# Step 1: Define the provider
provider "aws" {
  region = "ap-south-1"
}

# Step 2: Create an S3 bucket
resource "aws_s3_bucket" "lab1_bucket" {
  bucket = "sandeep-terraform-lab1-bucket-001"  # bucket name must be globally
unique
  acl    = "private"
}
```

This file says: - Use AWS in Mumbai region. - Create a private S3 bucket.

Step 5: Initialize Terraform

Inside the folder, run:

```
terraform init
```

This command downloads the AWS provider plugin.

Step 6: Preview the Infrastructure Plan

Run:

```
terraform plan
```

Terraform tells you: - What it will create - What changes will happen - No surprises

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Step 7: Apply the Terraform Configuration

Run:

```
terraform apply
```

Type **yes** when prompted.

Terraform will now create your S3 bucket in AWS.

Step 8: Validate in AWS Console

1. Go to AWS Console → S3.
2. Search for the bucket name.
3. You should see the bucket created through Terraform.

Step 9: Destroy the Infrastructure (Optional)

If you want to remove it:

```
terraform destroy
```

Type **yes** when asked.

This ensures your AWS is clean and costs nothing.

Summary

In this lab, you: - Understood the core idea of Terraform. - Learned how Terraform automates AWS infrastructure. - Installed and configured Terraform. - Created your first real AWS resource using Terraform. - Learned the essential workflow: **init → plan → apply**.

You are now ready for more advanced Terraform labs!

End of Lab 1