

Lab 8: Using Variables in Terraform (Single File VM Deployment)

Author: Dr. Sandeep Kumar Sharma

Level: Beginner

Platform: Ubuntu Linux + Microsoft Azure

Prerequisite: Lab 1 to Lab 7

Introduction to Variables in Terraform

What is a Variable?

A **variable** is a container that stores a value.

In simple words: - Variable = Value holder

Example: - Name = Sandeep

Here, `Name` is variable and `Sandeep` is value.

Why Variables are Important in Terraform

Without variables: - Values are fixed (hardcoded) - Code cannot be reused - Changes require editing code again and again

With variables: - Code becomes reusable - Configuration becomes flexible - Environment changes become easy - Infrastructure becomes dynamic

Variable Concept in Terraform

Terraform uses variables to: - Avoid hardcoding values - Make code reusable - Support multiple environments - Improve maintainability

Types of Variables in Terraform (Basic Level)

- String
- Number
- Boolean
- List

- Map

(In this lab, we will use only **string** variables)

How Variables Work in Terraform

Flow:

Declare Variable → Define Value → Use Variable in Resource

Hands-On Lab

Objective

Create one Linux Virtual Machine using **only variables** in a **single Terraform file**.

Step 1: Go to Terraform Directory

```
cd terraform-azure-lab
```

Step 2: Create One Terraform File

```
touch vm_with_variables.tf
```

Step 3: Open File

```
nano vm_with_variables.tf
```

Step 4: Complete Single File Configuration

Paste **everything** below in one file:

```
#####
# Variables Declaration
#####

variable "rg_name" {
  description = "Resource Group name"
  type        = string
  default     = "rg-terraform-lab"
}

variable "location" {
  description = "Azure region"
  type        = string
  default     = "East US"
}

variable "vnet_name" {
  description = "Virtual Network name"
  type        = string
  default     = "vnet-variable-lab"
}

variable "subnet_name" {
  description = "Subnet name"
  type        = string
  default     = "subnet-variable-lab"
}

variable "nsg_name" {
  description = "Network Security Group name"
  type        = string
  default     = "nsg-variable-lab"
}

variable "public_ip_name" {
  description = "Public IP name"
  type        = string
  default     = "pip-variable-lab"
}

variable "nic_name" {
  description = "NIC name"
  type        = string
  default     = "nic-variable-lab"
}

variable "vm_name" {
```

```

    description = "Virtual Machine name"
    type        = string
    default     = "Sandeep-machine-variable"
}

variable "admin_username" {
    description = "VM admin username"
    type        = string
    default     = "azureuser"
}

variable "vm_size" {
    description = "VM size"
    type        = string
    default     = "Standard_B1s"
}

#####
# Provider
#####

terraform {
    required_providers {
        azurerm = {
            source = "hashicorp/azurerm"
            version = "~> 3.0"
        }
    }
}

provider "azurerm" {
    features {}
}

#####
# Resource Group
#####

resource "azurerm_resource_group" "rg" {
    name     = var.rg_name
    location = var.location
}

#####
# Virtual Network
#####

resource "azurerm_virtual_network" "vnet" {

```

```

    name                = var.vnet_name
    address_space        = ["10.10.0.0/16"]
    location             = var.location
    resource_group_name = var.rg_name
}

#####
# Subnet
#####

resource "azurerm_subnet" "subnet" {
    name                = var.subnet_name
    resource_group_name = var.rg_name
    virtual_network_name = azurerm_virtual_network.vnet.name
    address_prefixes    = ["10.10.1.0/24"]
}

#####
# Network Security Group
#####

resource "azurerm_network_security_group" "nsg" {
    name                = var.nsg_name
    location            = var.location
    resource_group_name = var.rg_name
}

#####
# Public IP
#####

resource "azurerm_public_ip" "pip" {
    name                = var.public_ip_name
    location            = var.location
    resource_group_name = var.rg_name
    allocation_method   = "Static"
}

#####
# Network Interface
#####

resource "azurerm_network_interface" "nic" {
    name                = var.nic_name
    location            = var.location
    resource_group_name = var.rg_name

    ip_configuration {

```

```

        name                        = "internal"
        subnet_id                   = azurerm_subnet.subnet.id
        private_ip_address_allocation = "Dynamic"
        public_ip_address_id         = azurerm_public_ip.pip.id
    }
}

#####
# Linux Virtual Machine
#####

resource "azurerm_linux_virtual_machine" "vm" {
    name                        = var.vm_name
    resource_group_name        = var.rg_name
    location                   = var.location
    size                       = var.vm_size
    admin_username              = var.admin_username

    network_interface_ids = [
        azurerm_network_interface.nic.id
    ]

    admin_ssh_key {
        username   = var.admin_username
        public_key = file("~/ssh/id_rsa.pub")
    }

    os_disk {
        caching              = "ReadWrite"
        storage_account_type = "Standard_LRS"
    }

    source_image_reference {
        publisher = "Canonical"
        offer     = "0001-com-ubuntu-server-focal"
        sku       = "20_04-lts"
        version   = "latest"
    }
}

```

Step 5: Initialize Terraform

```
terraform init
```

Step 6: Plan

```
terraform plan
```

Step 7: Apply

```
terraform apply
```

Type:

```
yes
```

Step 8: Verify VM

VM Name:

```
Sandeep-machine-variable
```

Step 9: Cleanup

```
terraform destroy
```

Type:

```
yes
```