

2025

Terraform Lab 03

PARAMETRIZE LAB02 TERRAFORM CONFIGURATION
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9. Open vars03s1.tf in a text editor and define variable blocks as follows. Enclose values in double quotation marks:

```
# a. Resource Group Name
variable "resource_group_name" {
  type      = string
  description = "Name of the resource group"
  default    = "lab03-rg"
}

# b. Location
variable "location" {
  type      = string
  description = "Azure region for the resources"
  default    = "East US"
}

# c. Virtual Network Name
variable "virtual_network_name" {
  type      = string
  description = "Name of the virtual network"
  default    = "lab03-vnet"
}

# d. Virtual Network Address Space
variable "virtual_network_address_space" {
  type      = string
  description = "Address space for the virtual network"
  default    = "10.1.0.0/16"
}

# e. Subnet Names
variable "subnet1_name" {
  type      = string
  description = "Name of subnet1"
  default    = "lab03-subnet1"
}

variable "subnet2_name" {
  type      = string
  description = "Name of subnet2"
  default    = "lab03-subnet2"
}

# f. Subnet Address Spaces
variable "subnet1_address_prefix" {
  type      = string
  description = "Address prefix for subnet1"
  default    = "10.1.1.0/24"
}

variable "subnet2_address_prefix" {
  type      = string
  description = "Address prefix for subnet2"
  default    = "10.1.2.0/24"
}

# g. Network Security Group Names
variable "nsg1_name" {
  type      = string
  description = "Name of Network Security Group 1"
  default    = "lab03-nsg1"
}

variable "nsg2_name" {
  type      = string
  description = "Name of Network Security Group 2"
  default    = "lab03-nsg2"
}
```

10. Open lab03s1.tf in a text editor and update as follows:

```
# Resource Group
resource "azurerm_resource_group" "lab03_rg" {
  name     = var.resource_group_name
  location = var.location
}

# Virtual Network
resource "azurerm_virtual_network" "lab03_vnet" {
  name           = var.virtual_network_name
  address_space  = [var.virtual_network_address_space]
  location       = azurerm_resource_group.lab03_rg.location
  resource_group_name = azurerm_resource_group.lab03_rg.name
}

# Subnet 1
resource "azurerm_subnet" "lab03_subnet1" {
  name           = var.subnet1_name
  resource_group_name = azurerm_resource_group.lab03_rg.name
  virtual_network_name = azurerm_virtual_network.lab03_vnet.name
  address_prefixes = [var.subnets_address_prefix]
}

# Network Security Group 1
resource "azurerm_network_security_group" "lab03_nsg1" {
  name           = var.nsg1_name
  location       = azurerm_resource_group.lab03_rg.location
  resource_group_name = azurerm_resource_group.lab03_rg.name

  security_rule {
    name          = "rule1"
    priority      = 100
    direction     = "inbound"
    access        = "Allow"
    protocol      = "Tcp"
    source_port_range = ""
    destination_port_range = "22"
    source_address_prefix = ""
    destination_address_prefix = ""
  }
}

# NSG Association with Subnet 1
resource "azurerm_subnet_network_security_group_association" "lab03_subnet1_nsg_assoc" {
  subnet_id      = azurerm_subnet.lab03_subnet1.id
  network_security_group_id = azurerm_network_security_group.lab03_nsg1.id
}

# Subnet 2
resource "azurerm_subnet" "lab03_subnet2" {
  name           = var.subnet2_name
  resource_group_name = azurerm_resource_group.lab03_rg.name
  virtual_network_name = azurerm_virtual_network.lab03_vnet.name
  address_prefixes = [var.subnet2_address_prefix]
}

# Network Security Group 2
resource "azurerm_network_security_group" "lab03_nsg2" {
  name           = var.nsg2_name
  location       = azurerm_resource_group.lab03_rg.location
  resource_group_name = azurerm_resource_group.lab03_rg.name

  security_rule {
    name          = "rule1"
    priority      = 100
    direction     = "inbound"
    access        = "Allow"
    protocol      = "Tcp"
    source_port_range = ""
    destination_port_range = "3389"
    source_address_prefix = ""
    destination_address_prefix = ""
  }

  security_rule {
    name          = "rule2"
    priority      = 200
    direction     = "inbound"
    access        = "Allow"
    protocol      = "Tcp"
    source_port_range = ""
    destination_port_range = "9985"
    source_address_prefix = ""
    destination_address_prefix = ""
  }
}

# NSG Association with Subnet 2
resource "azurerm_subnet_network_security_group_association" "lab03_subnet2_nsg_assoc" {
  subnet_id      = azurerm_subnet.lab03_subnet2.id
  network_security_group_id = azurerm_network_security_group.lab03_nsg2.id
}
```

15. Re-run validation until no errors are reported.

```
D:\8th Semester\DevOps\lab03s1>terraform validate
Success! The configuration is valid.
```

22. View and analyze state information:

```
D:\8th Semester\DevOps\lab03s1>terraform state list
azurerm_network_security_group.lab02_nsg1
azurerm_network_security_group.lab02_nsg2
azurerm_network_security_group.lab03_nsg1
azurerm_network_security_group.lab03_nsg2
azurerm_resource_group.lab02_rg
azurerm_resource_group.lab03_rg
azurerm_subnet.lab02_subnet1
azurerm_subnet.lab02_subnet2
azurerm_subnet.lab03_subnet1
azurerm_subnet.lab03_subnet2
azurerm_subnet_network_security_group_association.lab02_subnet2_nsg_assoc
azurerm_subnet_network_security_group_association.lab02_subnet_nsg_assoc
azurerm_subnet_network_security_group_association.lab03_subnet1_nsg_assoc
azurerm_subnet_network_security_group_association.lab03_subnet2_nsg_assoc
azurerm_virtual_network.lab02_vnet
azurerm_virtual_network.lab03_vnet
```

```
D:\8th Semester\DevOps\lab03s1>terraform show
# azurerm_network_security_group.lab02_nsg1:
resource "azurerm_network_security_group" "lab02_nsg1" {
  id          = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg1"
  location    = "eastus"
  name        = "Lab02-nsg1"
  resource_group_name = "Lab02-rg"
  security_rule = [
    {
      access           = "Allow"
      description     = null
      destination_address_prefix = "*"
      destination_address_prefixes = []
      destination_application_security_group_ids = []
      destination_port_range = "22"
      destination_port_ranges = []
      direction        = "Inbound"
      name            = "rule1"
      priority        = 100
      protocol        = "Tcp"
      source_address_prefix = "*"
      source_address_prefixes = []
      source_application_security_group_ids = []
      source_port_range = "*"
      source_port_ranges = []
    },
  ],
}

# azurerm_network_security_group.lab02_nsg2:
resource "azurerm_network_security_group" "lab02_nsg2" {
  id          = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg2"
  location    = "eastus"
  name        = "Lab02-nsg2"
  resource_group_name = "Lab02-rg"
  security_rule = [
    {
      access           = "Allow"
      description     = null
      destination_address_prefix = "*"
      destination_address_prefixes = []
      destination_application_security_group_ids = []
      destination_port_range = "3389"
      destination_port_ranges = []
      direction        = "Inbound"
      name            = "rule1"
      priority        = 100
      protocol        = "Tcp"
      source_address_prefix = "*"
      source_address_prefixes = []
      source_application_security_group_ids = []
      source_port_range = "*"
      source_port_ranges = []
    },
  ],
}
```

```

        source_address_prefixes      = []
        source_application_security_group_ids = []
        source_port_range            = "*"
        source_port_ranges          = []
    },
    {
        access                  = "Allow"
        description             = null
        destination_address_prefix = "*"
        destination_address_prefixes = []
        destination_application_security_group_ids = []
        destination_port_range     = "5985"
        destination_port_ranges   = []
        direction                = "Inbound"
        name                     = "rule2"
        priority                 = 200
        protocol                 = "Tcp"
        source_address_prefix     = "*"
        source_address_prefixes   = []
        source_application_security_group_ids = []
        source_port_range          = "*"
        source_port_ranges          = []
    },
]
}

# azurerm_network_security_group.lab03_nsg1:
resource "azurerm_network_security_group" "lab03_nsg1" {
    id           = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/Lab03-nsg1"
    location     = "eastus"
    name         = "Lab03-nsg1"
    resource_group_name = "Lab03-rg"
    security_rule = [
    {
        access                  = "Allow"
        description             = null
        destination_address_prefix = "*"
        destination_address_prefixes = []
        destination_application_security_group_ids = []
        destination_port_range     = "22"
        destination_port_ranges   = []
        direction                = "Inbound"
        name                     = "rule1"
        priority                 = 100
        protocol                 = "Tcp"
        source_address_prefix     = "*"
        source_address_prefixes   = []
        source_application_security_group_ids = []
        source_port_range          = "*"
        source_port_ranges          = []
    },
    ],
}

# azurerm_network_security_group.lab03_nsg2:
resource "azurerm_network_security_group" "lab03_nsg2" {

# azurerm_network_security_group.lab03_nsg2:
resource "azurerm_network_security_group" "lab03_nsg2" {
    id           = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/Lab03-nsg2"
    location     = "eastus"
    name         = "Lab03-nsg2"
    resource_group_name = "Lab03-rg"
    security_rule = [
    {
        access                  = "Allow"
        description             = null
        destination_address_prefix = "*"
        destination_address_prefixes = []
        destination_application_security_group_ids = []
        destination_port_range     = "3389"
        destination_port_ranges   = []
        direction                = "Inbound"
        name                     = "rule1"
        priority                 = 100
        protocol                 = "Tcp"
        source_address_prefix     = "*"
        source_address_prefixes   = []
        source_application_security_group_ids = []
        source_port_range          = "*"
        source_port_ranges          = []
    },
    {
        access                  = "Allow"
        description             = null
        destination_address_prefix = "*"
        destination_address_prefixes = []
        destination_application_security_group_ids = []
        destination_port_range     = "5985"
        destination_port_ranges   = []
        direction                = "Inbound"
        name                     = "rule2"
        priority                 = 200
        protocol                 = "Tcp"
        source_address_prefix     = "*"
        source_address_prefixes   = []
        source_application_security_group_ids = []
        source_port_range          = "*"
        source_port_ranges          = []
    },
    ],
}

# azurerm_resource_group.lab02_rg:
resource "azurerm_resource_group" "lab02_rg" {
    id           = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg"
    location     = "eastus"
    managed_by   = null
    name         = "Lab02-rg"
}

```

```

    ]
}

# azurerm_resource_group.lab02_rg:
resource "azurerm_resource_group" "lab02_rg" {
  id      = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg"
  location = "eastus"
  managed_by = null
  name     = "Lab02-rg"
}

# azurerm_resource_group.lab03_rg:
resource "azurerm_resource_group" "lab03_rg" {
  id      = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg"
  location = "eastus"
  managed_by = null
  name     = "Lab03-rg"
}

# azurerm_subnet.lab02_subnet1:
resource "azurerm_subnet" "lab02_subnet1" {
  address_prefixes           = [
    "10.0.1.0/24",
  ]
  default_outbound_access_enabled = true
  id                          = "subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet1"
  name                        = "Lab02-subnet1"
  private_endpoint_network_policies = "Disabled"
  private_link_service_network_policies_enabled = true
  resource_group_name        = "Lab02-rg"
  virtual_network_name       = "Lab02-vnet"
}

# azurerm_subnet.lab02_subnet2:
resource "azurerm_subnet" "lab02_subnet2" {
  address_prefixes           = [
    "10.0.2.0/24",
  ]
  default_outbound_access_enabled = true
  id                          = "subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
  name                        = "Lab02-subnet2"
  private_endpoint_network_policies = "Disabled"
  private_link_service_network_policies_enabled = true
  resource_group_name        = "Lab02-rg"
  virtual_network_name       = "Lab02-vnet"
}

# azurerm_subnet.lab03_subnet1:
resource "azurerm_subnet" "lab03_subnet1" {
  address_prefixes           = [
    "10.1.1.0/24",
  ]
  default_outbound_access_enabled = true
  id                          = "subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet1"
  name                        = "Lab03-subnet1"
}

# azurerm_subnet.lab03_subnet2:
resource "azurerm_subnet" "lab03_subnet2" {
  address_prefixes           = [
    "10.1.2.0/24",
  ]
  default_outbound_access_enabled = true
  id                          = "subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
  name                        = "Lab03-subnet2"
  private_endpoint_network_policies = "Disabled"
  private_link_service_network_policies_enabled = true
  resource_group_name        = "Lab03-rg"
  virtual_network_name       = "Lab03-vnet"
}

# azurerm_subnet_network_security_group_association.lab02_subnet2_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab02_subnet2_nsg_assoc" {
  id      = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
  network_security_group_id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg2"
  subnet_id          = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
}

# azurerm_subnet_network_security_group_association.lab02_subnet_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab02_subnet_nsg_assoc" {
  id      = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet1"
  network_security_group_id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg1"
  subnet_id          = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet1"
}

# azurerm_subnet_network_security_group_association.lab03_subnet1_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab03_subnet1_nsg_assoc" {
  id      = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet1"
  network_security_group_id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg1"
  subnet_id          = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet1"
}

# azurerm_subnet_network_security_group_association.lab03_subnet2_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab03_subnet2_nsg_assoc" {
  id      = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
  network_security_group_id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg2"
  subnet_id          = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
}

```

```

    }
}

# azurerm_subnet_network_security_group_association.lab03_subnet1_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab03_subnet1_nsg_assoc" {
  id          = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet1"
  network_security_group_id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg1"
  subnet_id   = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet1"
}

# azurerm_subnet_network_security_group_association.lab03_subnet2_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab03_subnet2_nsg_assoc" {
  id          = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
  network_security_group_id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg2"
  subnet_id   = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
}

# azurerm_virtual_network.lab02_vnet:
resource "azurerm_virtual_network" "lab02_vnet" {
  address_space     = [
    "10.0.0.0/16",
  ]
  bgp_community     = null
  dns_servers       = []
  edge_zone         = null
  flow_timeout_in_minutes = 0
  guid              = "3123aaefb-d169-007d-b8b7-defa95cb7c11"
  id                = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet"
  location          = "eastus"
  name              = "lab02-vnet"
  private_endpoint_vnet_policies = "Disabled"
  resource_group_name = "lab02-rg"
  subnet             = []
}

# azurerm_virtual_network.lab03_vnet:
resource "azurerm_virtual_network" "lab03_vnet" {
  address_space     = [
    "10.1.0.0/16",
  ]
  bgp_community     = null
  dns_servers       = []
  edge_zone         = null
  flow_timeout_in_minutes = 0
  guid              = "f07a4da2-af19-0470-8f55-94e69cffbf7"
  id                = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet"
  location          = "eastus"
  name              = "lab03-vnet"
  private_endpoint_vnet_policies = "Disabled"
  resource_group_name = "lab03-rg"
  subnet             = []
}

```

23. Log in to the Azure Portal. Navigate to the resource group and confirm all resources exist as per specifications.

The screenshot shows the Microsoft Azure Resource groups page. At the top, there's a search bar and a Copilot button. Below the search bar, there are buttons for 'Create', 'Manage view', 'Refresh', 'Export to CSV', 'Open query', and 'Assign tags'. A message indicates 'You are viewing a new version of Browse experience. Some features may be missing. Click here to access the old experience.' Below these are filter buttons for 'Subscription equals all' and 'Location equals all', along with an 'Add filter' button. The main table lists five resource groups:

	Subscription	Location
<input type="checkbox"/> DefaultResourceGroup-EUS	... Azure for Students	East US
<input type="checkbox"/> lab02-rg	... Azure for Students	East US
<input type="checkbox"/> lab03-rg	... Azure for Students	East US
<input type="checkbox"/> NetworkWatcherRG	... Azure for Students	East US

The screenshot shows the Microsoft Azure Resource groups page for the 'lab02-rg' resource group. The left sidebar shows a tree view of other resource groups: 'DefaultResourceGroup-EUS', 'lab02-rg' (selected), 'lab03-rg', and 'NetworkWatcherRG'. The main area has tabs for 'Overview' and 'Essentials'. Under 'Overview', there are sections for 'Activity log', 'Access control (IAM)', 'Tags', 'Resource visualizer', and 'Events'. Under 'Essentials', there are sections for 'Resources' and 'Recommendations'. The 'Resources' section includes a table with three records:

Name ↑	Type ↑	Location ↑
lab02-nsg1	Network security group	East US
lab02-nsg2	Network security group	East US
lab02-vnet	Virtual network	East US

The screenshot shows the Microsoft Azure Resource Groups interface. On the left, there's a sidebar with 'Resource groups' and a message about a new version of the browser experience. The main area shows the 'lab03-rg' resource group under 'Essentials'. It lists three resources: 'lab03-nsg1' (Network security group, East US), 'lab03-nsg2' (Network security group, East US), and 'lab03-vnet' (Virtual network, East US). There are also tabs for 'Activity log', 'Access control (IAM)', 'Tags', 'Events', 'Settings', 'Deployments', 'Security', 'Deployment stacks', and 'Policies'.

25. Verify deletion:

```
Destroy complete! Resources: 16 destroyed.

D:\8th Semester\DevOps\lab03s1>terraform state list

D:\8th Semester\DevOps\lab03s1>terraform show
The state file is empty. No resources are represented.

D:\8th Semester\DevOps\lab03s1>
```

5. Open vars03s2.tf in a text editor and define variable blocks for a Linux virtual machine. Enclose values in double quotation marks:

```

# a. VM Name
variable "linux_name" {
  default = "lab03s2-db1-u-vm1"
}

# b. VM Size
variable "linux_vm_size" {
  default = "Standard_B1s"
}

# c. Admin Username
variable "admin_username" {
  default = "Roha-2112124"  # Replace this with your actual name and ID
}

# d. Public Key Path
variable "public_key_path" {
  default = "C:\\\\Users\\\\hp\\\\.ssh\\\\id_rsa.pub"  # Replace with your actual Windows username
}

# e. OS Disk Attributes
variable "os_disk_storage_account_type" {
  default = "Premium_LRS"
}

variable "os_disk_size_gb" {
  default = "32"
}

variable "os_disk_caching" {
  default = "ReadWrite"
}

# f. Ubuntu Linux OS Information
variable "linux_publisher" {
  default = "Canonical"
}

variable "linux_offer" {
  default = "UbuntuServer"
}

variable "linux_sku" {
  default = "19.04"
}

variable "linux_version" {
  default = "latest"
}

```

6. Open lab03s2.tf in a text editor and define resource blocks as follows:

```

# Public IP
resource "azurerm_public_ip" "linux_pip" {
  name          = "${var.linux_name}-pip"
  location      = azurerm_resource_group.lab03_rg.location
  resource_group_name = azurerm_resource_group.lab03_rg.name
  allocation_method = "Dynamic"
  sku           = "Basic"
}

# Network Interface
resource "azurerm_network_interface" "linux_nic" {
  name          = "${var.linux_name}-nic"
  location      = azurerm_resource_group.lab03_rg.location
  resource_group_name = azurerm_resource_group.lab03_rg.name

  ip_configuration {
    name          = "${var.linux_name}-ipconfig1"
    subnet_id     = azurerm_subnet.lab03_subnet1.id
    private_ip_address_allocation = "Dynamic"
    public_ip_address_id       = azurerm_public_ip.linux_pip.id
  }
}

# Linux Virtual Machine
resource "azurerm_linux_virtual_machine" "linux_vm" {
  name          = var.linux_name
  location      = azurerm_resource_group.lab03_rg.location
  resource_group_name = azurerm_resource_group.lab03_rg.name
  size          = var.linux_vm_size
  admin_username = var.admin_username
  network_interface_ids = [azurerm_network_interface.linux_nic.id]

  admin_ssh_key {
    username    = var.admin_username
    public_key  = file(var.public_key_path)
  }

  os_disk {
    caching          = var.os_disk_caching
    storage_account_type = var.os_disk_storage_account_type
    disk_size_gb     = var.os_disk_size_gb
    name             = "${var.linux_name}-osdisk"
  }

  source_image_reference {
    publisher = "Canonical"
    offer      = "0001-com-ubuntu-server-jammy"
    sku        = "22_04-lts"
    version    = "latest"
  }

  disable_password_authentication = true
}

```

8. Validate the configuration to ensure no errors or typos:

```
D:\8th Semester\DevOps\lab03s2>terraform validate  
Success! The configuration is valid.
```

17. View and analyze state information:

```
D:\8th Semester\DevOps\lab03s2>terraform state list  
azurerm_linux_virtual_machine.linux_vm  
azurerm_network_interface.linux_nic  
azurerm_network_security_group.lab02_nsg1  
azurerm_network_security_group.lab02_nsg2  
azurerm_network_security_group.lab03_nsg1  
azurerm_network_security_group.lab03_nsg2  
azurerm_public_ip.linux_pip  
azurerm_resource_group.lab02_rg  
azurerm_resource_group.lab03_rg  
azurerm_subnet.lab02_subnet1  
azurerm_subnet.lab02_subnet2  
azurerm_subnet.lab03_subnet1  
azurerm_subnet.lab03_subnet2  
azurerm_subnet_network_security_group_association.lab02_subnet2_nsg_assoc  
azurerm_subnet_network_security_group_association.lab02_subnet_nsg_assoc  
azurerm_subnet_network_security_group_association.lab03_subnet1_nsg_assoc  
azurerm_subnet_network_security_group_association.lab03_subnet2_nsg_assoc  
azurerm_virtual_network.lab02_vnet  
azurerm_virtual_network.lab03_vnet
```

```
D:\8th Semester\DevOps\lab03s2>terraform show  
# azurerm_linux_virtual_machine.linux_vm  
resource "azurerm_linux_virtual_machine" "linux_vm" {  
    admin_username          = "hp-rohalaptop"  
    allow_extension_operations = true  
    assign_public_ip_address = null  
    bypass_platform_safety_checks_on_user_schedule_enabled = false  
    capacity_reservation_group_id = null  
    computer_name           = "lab03s2-dbl-u-vml"  
    dedicated_host_group_id = null  
    dedicated_host_id       = null  
    disk_controller_type    = true  
    disk_controller_type    = null  
    encryption_at_host_enabled = false  
    eviction_policy         = null  
    extensions_time_budget = "1H30M"  
    id                      = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Compute/virtualMachines/lab03s2-dbl-u-vml"  
    license_type             = null  
    location                = "eastus"  
    max_bid_price           = -1  
    name                    = "lab03s2-dbl-u-vml"  
    network_interface_ids   = [  
        "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkInterfaces/lab03s2-dbl-u-vml-nic",  
    ]  
    patch_assessment_mode    = "ImageDefault"  
    patch_mode               = "ImageDefault"  
    priority_fault_domain   = null  
    priority                = "Regular"  
    private_ip_address       = "19.1.1.4"  
    private_ip_addresses     = [  
        "19.1.1.4",  
    ]  
    provision_vm_agent      = true  
    proximity_placement_group_id = null  
    public_ip_address        = "172.191.65.180"  
    public_ip_addresses      = [  
        "172.191.65.180",  
    ]  
    reboot_setting           = null  
    resource_group_name      = "lab03-rg"  
    secure_boot_enabled      = false  
    size                     = "Standard_B1s"  
    source_image_id          = null  
    user_data                = null  
    virtual_machine_id       = "6934a203-0320-49ac-ac3e-1fc7dca6a8cd"  
    virtual_machine_scale_set_id = null  
    vm_agent_platform_updates_enabled = false  
    vtpm_enabled              = false  
    zone                     = null  
  
    admin_ssh_key {  
        public_key = <<--EOT
```

```

private_ip_addresses = [
    "10.1.1.4",
]
resource_group_name = "lab03-rg"
tags = {}
virtual_machine_id = null

ip_configuration {
    gateway_load_balancer_frontend_ip_configuration_id = null
    name = "lab03s2-dbl-u-vml-ipconfig1"
}

network_interface {
    accelerated_networking_enabled = false
    applied_dns_servers = []
    auxiliary_mode = null
    auxiliary_sku = null
    dns_servers = []
    dns_zone = null
    id = "/subscriptions/9df1e749-10d1-4aed-ba5c-07ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkInterfaces/lab03s2-dbl-u-vml-nic"
    internal_dns_name_label = null
    internal_domain_name_suffix = "mydygylbb5j4u3g2pmz4tcydzga.bx.internal.cloudapp.net"
    ip_address_allocation_enabled = false
    location = "eastus"
    mac_address = null
    name = "lab03s2-dbl-u-vml-nic"
    private_ip_address = "10.1.1.4"
    private_ip_addresses = [
        "10.1.1.4",
    ]
}

# azurerm_network_interface_linux_nic:
resource_group_name = "lab03-rg"
azurerm_network_interface_linux_nic {
    accelerated_networking_enabled = false
    applied_dns_servers = []
    auxiliary_mode = null
    auxiliary_sku = null
    dns_servers = []
    dns_zone = null
    id = "/subscriptions/9df1e749-10d1-4aed-ba5c-07ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkInterfaces/lab03s2-dbl-u-vml-nic"
    internal_dns_name_label = null
    internal_domain_name_suffix = "mydygylbb5j4u3g2pmz4tcydzga.bx.internal.cloudapp.net"
    ip_address_allocation_enabled = false
    location = "eastus"
    mac_address = null
    name = "lab03s2-dbl-u-vml-nic"
    private_ip_address = "10.1.1.4"
    private_ip_addresses = [
        "10.1.1.4",
    ]
}

resource_group_name = "lab03-rg"
tags = {}
virtual_machine_id = null

ip_configuration {
    gateway_load_balancer_frontend_ip_configuration_id = null
    name = "lab03s2-dbl-u-vml-ipconfig1"
}

# azurerm_network_security_group_lab02_ns1:
resource_group_name = "lab02-ns1"
azurerm_network_security_group_lab02_ns1 {
    id = "/subscriptions/9df1e749-10d1-4aed-ba5c-07ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-ns1"
    location = "eastus"
    name = "lab02-ns1"
    resource_group_name = "lab02-rg"
    security_rule = [
        {
            access = "Allow"
            description = null
            destination_address_prefix = "*"
            destination_address_prefixes = []
            destination_application_security_group_ids = []
            destination_port_range = "22"
            destination_port_ranges = []
            direction = "inbound"
            name = "rule1"
            priority = 100
            protocol = "Tcp"
            source_address_prefix = "*"
            source_address_prefixes = []
            source_application_security_group_ids = []
            source_port_range = "*"
            source_port_ranges = []
        },
    ]
    tags = {}
}

# azurerm_network_security_group_lab02_ns2:
resource_group_name = "lab02-ns2"
azurerm_network_security_group_lab02_ns2 {
    id = "/subscriptions/9df1e749-10d1-4aed-ba5c-07ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-ns2"
    location = "eastus"
    name = "lab02-ns2"
    resource_group_name = "lab02-rg"
    security_rule = [
        {
            access = "Allow"
            description = null
            destination_address_prefix = "*"
            destination_address_prefixes = []
            destination_application_security_group_ids = []
            destination_port_range = "3389"
            destination_port_ranges = []
            direction = "inbound"
        }
    ]
}

```

```

        source_address_prefixes      = []
        source_application_security_group_ids = []
        source_port_range            = "*"
        source_port_ranges          = []
    },
    {
        access                  = "Allow"
        description             = null
        destination_address_prefix = "*"
        destination_address_prefixes = []
        destination_application_security_group_ids = []
        destination_port_range     = "5985"
        destination_port_ranges   = []
        direction                = "Inbound"
        name                    = "rule2"
        priority                = 200
        protocol                = "Tcp"
        source_address_prefix     = "*"
        source_address_prefixes   = []
        source_application_security_group_ids = []
        source_port_range         = "*"
        source_port_ranges        = []
    },
],
tags           = {}
}

# azurerm_network_security_group.lab03_nsg1:
resource "azurerm_network_security_group" "lab03_nsg1" {
id          = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg1"
location     = "eastus"
name        = "Lab03-nsg1"
resource_group_name = "Lab03-rg"
security_rule = [
{
    access                  = "Allow"
    description             = null
    destination_address_prefix = "*"
    destination_address_prefixes = []
    destination_application_security_group_ids = []
    destination_port_range     = "22"
    destination_port_ranges   = []
    direction                = "Inbound"
    name                    = "rule1"
    priority                = 100
    protocol                = "Tcp"
    source_address_prefix     = "*"
    source_address_prefixes   = []
    source_application_security_group_ids = []
    source_port_range         = "*"
    source_port_ranges        = []
},
]
tags           = {}
}

# azurerm_network_security_group.lab03_nsg2:
resource "azurerm_network_security_group" "lab03_nsg2" {
id          = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg2"
location     = "eastus"
name        = "Lab03-nsg2"
resource_group_name = "Lab03-rg"
security_rule = [
{
    access                  = "Allow"
    description             = null
    destination_address_prefix = "*"
    destination_address_prefixes = []
    destination_application_security_group_ids = []
    destination_port_range     = "3389"
    destination_port_ranges   = []
    direction                = "Inbound"
    name                    = "rule1"
    priority                = 100
    protocol                = "Tcp"
    source_address_prefix     = "*"
    source_address_prefixes   = []
    source_application_security_group_ids = []
    source_port_range         = "*"
    source_port_ranges        = []
},
{
    access                  = "Allow"
    description             = null
    destination_address_prefix = "*"
    destination_address_prefixes = []
    destination_application_security_group_ids = []
    destination_port_range     = "5985"
    destination_port_ranges   = []
    direction                = "Inbound"
    name                    = "rule2"
    priority                = 200
    protocol                = "Tcp"
    source_address_prefix     = "*"
    source_address_prefixes   = []
    source_application_security_group_ids = []
    source_port_range         = "*"
    source_port_ranges        = []
},
]
tags           = {}
}

# azurerm_public_ip.linux_pip:
resource "azurerm_public_ip" "linux_pip" {
allocation_method      = "dynamic"
ddos_protection_mode  = "VirtualNetworkInherited"
edge_zone              = null
id                    = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/publicIPAddresses/lab03s2-db1-u-vml-pip"
}

```

```

resource "azurerm_public_ip" "linux_pip" {
  allocation_method = "Dynamic"
  ddos_protection_mode = "VirtualNetworkInherited"
  edge_zone = null
  id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/publicIPAddresses/lab03s2-dbl-u-vml-pip"
  idle_timeout_in_minutes = null
  ip_address =
  ip_tags =
  ip_version = "IPv4"
  location =
  name = "lab03s2-dbl-u-vml-pip"
  resource_group_name = "lab03-rg"
  sku =
  sku_tier = "Regional"
  tags =
  zones =
}

# azurerm_resource_group.lab02_rg:
resource "azurerm_resource_group" "lab02_rg" {
  id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg"
  location = "eastus"
  managed_by = null
  name = "lab02-rg"
  tags = {}
}

# azurerm_resource_group.lab03_rg:
resource "azurerm_resource_group" "lab03_rg" {
  id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg"
  location = "eastus"
  managed_by = null
  name = "lab03-rg"
  tags = {}
}

# azurerm_subnet.lab02_subnet1:
resource "azurerm_subnet" "lab02_subnet1" {
  address_prefixes = [
    "10.0.1.0/24",
  ]
  default_outbound_access_enabled = true
  id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet1"
  name =
  private_endpoint_network_policies =
  private_link_service_network_policies_enabled = true
  resource_group_name =
  service_endpoint_policy_ids =
  service_endpoints =
  virtual_network_name =
}

# azurerm_subnet.lab02_subnet2:
resource "azurerm_subnet" "lab02_subnet2" {
  address_prefixes = [
    "10.0.2.0/24",
  ]
}

# azurerm_subnet.lab02_subnet2:
resource "azurerm_subnet" "lab02_subnet2" {
  address_prefixes = [
    "10.0.2.0/24",
  ]
  default_outbound_access_enabled = true
  id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
  name = "lab02-subnet2"
  private_endpoint_network_policies =
  private_link_service_network_policies_enabled = true
  resource_group_name =
  service_endpoint_policy_ids =
  service_endpoints =
  virtual_network_name =
}

# azurerm_subnet.lab03_subnet1:
resource "azurerm_subnet" "lab03_subnet1" {
  address_prefixes = [
    "10.1.1.0/24",
  ]
  default_outbound_access_enabled = true
  id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet1"
  name = "label1-subnet1"
  private_endpoint_network_policies =
  private_link_service_network_policies_enabled = true
  resource_group_name =
  service_endpoint_policy_ids =
  service_endpoints =
  virtual_network_name =
}

# azurerm_subnet.lab03_subnet2:
resource "azurerm_subnet" "lab03_subnet2" {
  address_prefixes = [
    "10.1.2.0/24",
  ]
  default_outbound_access_enabled = true
  id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
  name = "label2-subnet2"
  private_endpoint_network_policies =
  private_link_service_network_policies_enabled = true
  resource_group_name =
  service_endpoint_policy_ids =
  service_endpoints =
  virtual_network_name =
}

# azurerm_subnet_network_security_group_association.lab02_subnet2_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab02_subnet2_nsg_assoc" {
  id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
  network_security_group_id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg2"
  subnet_id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
}

```

```

        id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
        network_security_group_id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg2"
        subnet_id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
    }

# azurerm_subnet_network_security_group_association.lab02_subnet_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab02_subnet_nsg_assoc" {
    id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet1"
    network_security_group_id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg1"
    subnet_id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet1"
}

# azurerm_subnet_network_security_group_association.lab03_subnet1_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab03_subnet1_nsg_assoc" {
    id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet1"
    network_security_group_id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg1"
    subnet_id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet1"
}

# azurerm_subnet_network_security_group_association.lab03_subnet2_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab03_subnet2_nsg_assoc" {
    id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
    network_security_group_id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg2"
    subnet_id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
}

# azurerm_virtual_network.lab02_vnet:
resource "azurerm_virtual_network" "lab02_vnet" {
    address_space = [
        "10.0.0.0/16",
    ]
    bgp_community = null
    dns_servers = []
    edge_zone = null
    flow_timeout_in_minutes = 0
    guid = "b355a1cd-6d3f-41f5-b75f-97997999cf55"
    id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet"
    location = "eastus"
    name = "lab02-vnet"
    private_endpoint_network_policies = "Disabled"
    resource_group_name = "lab02-rg"
    subnet = [
        {
            address_prefixes = ["10.0.1.0/24"],
            delegation = null,
            id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet1",
            name = "lab02-subnet1",
            private_endpoint_network_policies = "Disabled"
            private_link_service_network_policies_enabled = true
            route_table_id = null,
            security_group = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg1",
            service_endpoint_policy_ids = []
        }
    ],
    tags = {}
}

# azurerm_virtual_network.lab03_vnet:
resource "azurerm_virtual_network" "lab03_vnet" {
    address_space = [
        "10.1.0.0/16",
    ]
    bgp_community = null
    dns_servers = []
    edge_zone = null
    flow_timeout_in_minutes = 0
    guid = "e16a0666-fa11-4e7d-9bf6-b67d31e07939"
    id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet"
    location = "eastus"
    name = "lab03-vnet"
    private_endpoint_network_policies = "Disabled"
    resource_group_name = "lab03-rg"
    subnet = [
        {
            address_prefixes = ["10.1.1.0/24"],
            delegation = null,
            id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet1",
            name = "lab03-subnet1",
            private_endpoint_network_policies = "Disabled"
            private_link_service_network_policies_enabled = true
            route_table_id = null,
            security_group = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg1",
            service_endpoint_policy_ids = []
        },
        {
            address_prefixes = ["10.1.2.0/24"],
            delegation = null,
            id = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2",
            name = "lab03-subnet2",
            private_endpoint_network_policies = "Disabled"
            private_link_service_network_policies_enabled = true
            route_table_id = null,
            security_group = "/subscriptions/9dfile749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg2",
            service_endpoints = []
        }
    ],
    tags = {}
}

```

18. Log in to the Azure Portal. Navigate to the resource group and confirm all resources exist as per specifications.

The screenshots show the Azure Resource Groups blade for three different resource groups: lab02-rg, lab02-rg, and lab03-rg. Each screen displays a list of resources within the group, including Network Security Groups (NSGs), Virtual Networks (VNets), and other Azure services.

Resource Group: lab02-rg (Screenshot 1)

Name	Type	Location
lab02-nsg1	Network security group	East US
lab02-nsg2	Network security group	East US
lab02-vnet	Virtual network	East US

Resource Group: lab02-rg (Screenshot 2)

Name	Type	Location
lab02-nsg1	Network security group	East US
lab02-nsg2	Network security group	East US
lab02-vnet	Virtual network	East US

Resource Group: lab03-rg (Screenshot 3)

Name	Type	Location
lab03-nsg1	Network security group	East US
lab03-nsg2	Network security group	East US
lab03-vnet	Virtual network	East US
lab03s2-db1-u-vm1	Virtual machine	East US
lab03s2-db1-u-vm1-nic	Network Interface	East US
lab03s2-db1-u-vm1-osdisk	Disk	East US
lab03s2-db1-u-vm1-pip	Public IP address	East US

20. Verify deletion:

```
Destroy complete! Resources: 19 destroyed.

D:\8th Semester\DevOps\lab03s2>terraform state list

D:\8th Semester\DevOps\lab03s2>terraform show
The state file is empty. No resources are represented.

D:\8th Semester\DevOps\lab03s2>
```

5. Open vars03s3.tf in a text editor and define a locals block at the beginning with the following values. Enclose values in double quotation marks:

```

locals {
  Name      = "Terraform-Class"
  Project   = "Learning"
  ContactEmail = "rohachaudry@hotmail.com"
  Environment = "Lab"
}

# a. VM Name
variable "linux_name" {
  default = "lab03s2-db1-u-vm1"
}

# b. VM Size
variable "linux_vm_size" {
  default = "Standard_B1s"
}

# c. Admin Username
variable "admin_username" {
  default = "hp-rohalaptop" # Replace this with your actual name and ID
}

# d. Public Key Path
variable "public_key_path" {
  default = "C:\\\\Users\\\\hp\\\\.ssh\\\\id_rsa.pub" # Replace with your actual Windows username
}

# e. OS Disk Attributes
variable "os_disk_storage_account_type" {
  default = "Premium_LRS"
}

variable "os_disk_size_gb" {
  default = "32"
}

variable "os_disk_caching" {
  default = "ReadWrite"
}

# f. Ubuntu Linux OS Information
variable "linux_publisher" {
  default = "Canonical"
}

variable "linux_offer" {
  default = "UbuntuServer"
}

variable "linux_sku" {
  default = "19.04"
}

variable "linux_version" {
  default = "latest"
}

```

6. Open lab03s3.tf in a text editor and add tags to network interface, public IP, and virtual machine resource blocks using the locals values.

```

# Public IP
resource "azurerm_public_ip" "linux_pip" {
  name                = "${var.linux_name}-pip"
  location            = azurerm_resource_group.lab03_rg.location
  resource_group_name = azurerm_resource_group.lab03_rg.name
  allocation_method   = "Dynamic"
  sku                 = "Basic"

  tags = {
    Name      = local.Name
    Project   = local.Project
    ContactEmail = local.ContactEmail
    Environment = local.Environment
  }
}

# Network Interface
resource "azurerm_network_interface" "linux_nic" {
  name                = "${var.linux_name}-nic"
  location            = azurerm_resource_group.lab03_rg.location
  resource_group_name = azurerm_resource_group.lab03_rg.name

  ip_configuration {
    name                  = "${var.linux_name}-ipconfig1"
    subnet_id             = azurerm_subnet.lab03_subnet1.id
    private_ip_address_allocation = "Dynamic"
    public_ip_address_id    = azurerm_public_ip.linux_pip.id
  }

  tags = {
    Name      = local.Name
    Project   = local.Project
    ContactEmail = local.ContactEmail
    Environment = local.Environment
  }
}

# Linux Virtual Machine
resource "azurerm_linux_virtual_machine" "linux_vm" {
  name                = var.linux_name
  location            = azurerm_resource_group.lab03_rg.location
  resource_group_name = azurerm_resource_group.lab03_rg.name
  size                = var.linux_vm_size
  admin_username       = var.admin_username
  network_interface_ids = [azurerm_network_interface.linux_nic.id]

  admin_ssh_key {
    username  = var.admin_username
    public_key = file(var.public_key_path)
  }

  os_disk {
    caching           = var.os_disk_caching
    storage_account_type = var.os_disk_storage_account_type
    disk_size_gb     = var.os_disk_size_gb
    name              = "${var.linux_name}-osdisk"
  }

  source_image_reference {
    publisher = "Canonical"
    offer     = "0001-com-ubuntu-server-jammy"
    sku       = "22_04-lts"
    version   = "latest"
  }

  disable_password_authentication = true

  tags = {
    Name      = local.Name
    Project   = local.Project
    ContactEmail = local.ContactEmail
    Environment = local.Environment
  }
}

```

10. Re-run validation until no errors are reported:

```
D:\8th Semester\DevOps\lab03s3>terraform validate
Success! The configuration is valid.
```

17. View and analyze state information:

```
Apply complete! Resources: 19 added, 0 changed, 0 destroyed.
```

```
D:\8th Semester\DevOps\lab03s3>terraform state list
azurerm_linux_virtual_machine.linux_vm
azurerm_network_interface.linux_nic
azurerm_network_security_group.lab02_nsg1
azurerm_network_security_group.lab02_nsg2
azurerm_network_security_group.lab03_nsg1
azurerm_network_security_group.lab03_nsg2
azurerm_public_ip.linux_pip
azurerm_resource_group.lab02_rg
azurerm_resource_group.lab03_rg
azurerm_subnet.lab02_subnet1
azurerm_subnet.lab02_subnet2
azurerm_subnet.lab03_subnet1
azurerm_subnet.lab03_subnet2
azurerm_subnet_network_security_group_association.lab02_subnet2_nsg_assoc
azurerm_subnet_network_security_group_association.lab02_subnet_nsg_assoc
azurerm_subnet_network_security_group_association.lab03_subnet1_nsg_assoc
azurerm_subnet_network_security_group_association.lab03_subnet2_nsg_assoc
azurerm_virtual_network.lab02_vnet
azurerm_virtual_network.lab03_vnet
```

```
D:\8th Semester\DevOps\lab03s3>
```

```
D:\8th Semester\DevOps\lab03s3>terraform show
# azurerm_linux_virtual_machine.linux_vm
resource "azurerm_linux_virtual_machine" "linux_vm" {
  admin_username          = "hp-rohalaptop"
  allow_sticky_operations = null
  availability_set_id    = null
  bypass_platform_safety_checks_on_user_schedule_enabled = false
  capacity_reservation_group_id = null
  computer_name           = "lab03s2-db1-u-vm1"
  dedicated_host_group_id = null
  diagnostics_logest_id   = null
  disable_password_authentication = true
  disk_controller_type    = null
  edge_zone                = null
  encryption_at_host_enabled = false
  eviction_policy          = "Priority"
  extensions_time_budget   = "/subscriptions/0df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Compute/virtualMachines/lab03s2-db1-u-vm1"
  id                      = null
  license_type              = "eastus"
  location                  = "East US"
  max_bid_price            = -1
  name                     = "lab03s2-db1-u-vm1"
  network_interface_ids    = [
    "/subscriptions/0df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkInterfaces/lab03s2-db1-u-vm1-nic",
  ]
  patch_assessment_mode     = "ImageDefault"
  patch_mode                 = "ImageDefault"
  placement_fault_domain    = null
  priority                  = "Regular"
  private_ip_address         = "10.1.1.4"
  private_ip_addresses       = [
    "10.1.1.4",
  ]
  provisioning_vm_agent      = true
  proximity_placement_group_id = null
  public_ip_address          = "172.191.204.157"
  public_ip_addresses         = [
    "172.191.204.157",
  ]
  reboot_setting             = null
  resource_group_name        = "lab03-rg"
  secure_boot_enabled        = false
  size                       = "Standard_B1s"
  source_image_id            = null
  tags                       = [
    {
      "ContactEmail" = "rohachaudry@hotmail.com"
      "Environment"  = "Lab"
      "Name"          = "Terraform-Class"
      "Project"       = "Learning"
    }
  ]
  user_data                  = null
  virtual_machine_id         = "a89524ea-7638-4445-a267-c7942c6e7762"
  virtual_machine_scale_set_id = null
  vm_agent_platform_updates_enabled = false
  vtpm_enabled               = false
}
```

```

    vtpm_enabled
    zone = null
    admin_ssh_key {
        public_key = <>EOT
        -----BEGIN RSA PRIVATE KEY-----M4AAQABAAAACQDIZ3n+3HhHZJYH2aFO2gE08+ZRNbbIDHMKKaMef1Zd3LZGke0ix2+y3pH8GVnUTrVnvpQgH+2L4vBF7K8sgtPPYDzvgLwUpf3TnKBWjzBWrzF3GSuUh6
        FUSAIQm34v179Vmws8n4dypENlrDjH+e+RR0euWq131Bxyyx1zGTyU/bcGwdmfFnOSLttvostifx20IWJPU2exAcrgpkTp18vY39cuexyDThqBL18X1buYaoXSV+HMK8UG2A]uX1Buz946ce1YRAud9V8q8tpp951653VtCt3677VbtZ6Cw0Hqnt
        SZwxqbeelHtGt6VrattyL1t6sw/UUVpvix/A3exVjdpcgahmt955MwvA+16/tfLb12f9p6onhkgIB8v8BHQCB82z60vcx9gSxtsCADPUA2YnbfFgstTuy000B1YzBudQ6IXFgtCnxz9qfQwhEwinc2UyUqq2/D577aiVghnsRoAh1kHflBj0MsokenzdbsccAicGk1
        pc0UEbeelHtGt6VrattyL1t6sw/UUVpvix/A3exVjdpcgahmt955MwvA+16/tfLb12f9p6onhkgIB8v8BHQCB82z60vcx9gSxtsCADPUA2YnbfFgstTuy000B1YzBudQ6IXFgtCnxz9qfQwhEwinc2UyUqq2/D577aiVghnsRoAh1kHflBj0MsokenzdbsccAicGk1
        EOT
        username = "hp-rshalaptop"
    }
    os_disk {
        caching = "ReadWrite"
        disk_encryption_set_id = null
        disk_size_gb = 32
        id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Compute/disks/lab03s2-db1-u-vm1-osdisk"
        name = "lab03s2-db1-u-vm1-osdisk"
        secure_vm_disk_encryption_set_id = null
        storage_account_type = "Standard_LRS"
        storage_account_name = null
        write_accelerator_enabled = false
    }
    source_image_reference {
        offer = "0001-com-ubuntu-server-jammy"
        publisher = "Canonical"
        sku = "22.04-lts"
        version = "Latest"
    }
}

# azurerm_network_interface.linux_nic:
resource "azurerm_network_interface" "linux_nic" {
    access_endpoint_networking_enabled = true
    allocated_ip_addresses = []
    auxiliary_dns_servers = null
    auxiliary_mode = null
    auxiliary_sku = null
    edge_zone = null
    internal_dns_name_label = null
    internal_domain_name_suffix = "ukfxrxu05qeqlh1vxdcfmzf.bx.internal.cloudapp.net"
    ip_forwarding_enabled = false
    location = "eastus"
    mac_address = null
    name = "lab03s2-db1-u-vm1-nic"
    private_ip_address = "10.1.1.4"
    private_ip_addresses = [
        "10.1.1.4",
    ]
    resource_group_name = "lab03-rg"
    tags = {
        "ContactEmail" = "rohachaudry@hotmail.com"
        "Environment" = "Lab"
        "Name" = "Terraform-Class"
    }
}

    "Project" = "Learning"
}
virtual_machine_id = null

ip_configuration {
    gateway_load_balancer_frontend_ip_configuration_id = null
    name = "lab03s2-db1-u-vm1-ipconfig1"
    primary = true
    private_ip_address = "10.1.1.4"
    private_ip_address_allocation = "Dynamic"
    private_ip_address_version = "IPv4"
    public_ip_address_id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/publicIPAddresses/lab03s2-db1-u-vm1-pip"
    subnet_id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-s
ubnet1"
}
}

# azurerm_network_security_group.lab02_nsg1:
resource "azurerm_network_security_group" "lab02_nsg1" {
    id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg1"
    location = "eastus"
    name = "lab02-nsg1"
    resource_group_name = "lab02-rg"
    security_rule = [
        {
            access = "Allow"
            description = null
            destination_address_prefix = "*"
            destination_address_prefixes = []
            destination_application_security_group_ids = []
            destination_port_range = "22"
            destination_port_ranges = [
                {
                    direction = "Inbound"
                    name = "rule1"
                    priority = 100
                    protocol = "TCP"
                    source_address_prefix = "*"
                    source_address_prefixes = []
                    source_application_security_group_ids = []
                    source_port_range = "*"
                    source_port_ranges = []
                },
            ],
        }
    ]
}

# azurerm_network_security_group.lab02_nsg2:
resource "azurerm_network_security_group" "lab02_nsg2" {
    id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg2"
    location = "eastus"
    name = "lab02-nsg2"
    resource_group_name = "lab02-rg"
    security_rule = [
        {
            access = "Allow"
            description = null
            destination_address_prefix = "*"
        }
    ]
}

```

```

destination_application_security_group_ids = []
destination_port_range = "3389"
destination_port_ranges = []
direction = "Inbound"
name = "rule1"
priority = 100
protocol = "Tcp"
source_address_prefix = "*"
source_address_prefixes = []
source_application_security_group_ids = []
source_port_range = "*"
source_port_ranges = []
},
{
access = "Allow"
description = null
destination_address_prefix = "*"
destination_address_prefixes = []
destination_application_security_group_ids = []
destination_port_range = "5985"
destination_port_ranges = []
direction = "Inbound"
name = "rule2"
priority = 200
protocol = "Tcp"
source_address_prefix = "*"
source_address_prefixes = []
source_application_security_group_ids = []
source_port_range = "*"
source_port_ranges = []
},
]
}

# azurerm_network_security_group.lab03_nsg1:
resource "azurerm_network_security_group" "lab03_nsg1" {
id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg1"
location = "eastus"
name = "lab03-nsg1"
resource_group_name = "lab03-rg"
security_rule = [
{
access = "Allow"
description = null
destination_address_prefix = "*"
destination_address_prefixes = []
destination_application_security_group_ids = []
destination_port_range = "22"
destination_port_ranges = []
direction = "Inbound"
name = "rule1"
priority = 100
protocol = "Tcp"
source_address_prefix = "*"
source_address_prefixes = []
source_application_security_group_ids = []
source_port_range = "*"
source_port_ranges = []
},
{
access = "Allow"
description = null
destination_address_prefix = "*"
destination_address_prefixes = []
destination_application_security_group_ids = []
destination_port_range = "3389"
destination_port_ranges = []
direction = "Inbound"
name = "rule1"
priority = 100
protocol = "Tcp"
source_address_prefix = "*"
source_address_prefixes = []
source_application_security_group_ids = []
source_port_range = "*"
source_port_ranges = []
},
{
access = "Allow"
description = null
destination_address_prefix = "*"
destination_address_prefixes = []
destination_application_security_group_ids = []
destination_port_range = "5985"
destination_port_ranges = []
direction = "Inbound"
name = "rule2"
priority = 200
protocol = "Tcp"
source_address_prefix = "*"
source_address_prefixes = []
source_application_security_group_ids = []
source_port_range = "*"
source_port_ranges = []
},
]

# azurerm_network_security_group.lab03_nsg2:
resource "azurerm_network_security_group" "lab03_nsg2" {
id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg2"
location = "eastus"
name = "lab03-nsg2"
resource_group_name = "lab03-rg"
security_rule = [
{
access = "Allow"
description = null
destination_address_prefix = "*"
destination_address_prefixes = []
destination_application_security_group_ids = []
destination_port_range = "3389"
destination_port_ranges = []
direction = "Inbound"
name = "rule1"
priority = 100
protocol = "Tcp"
source_address_prefix = "*"
source_address_prefixes = []
source_application_security_group_ids = []
source_port_range = "*"
source_port_ranges = []
},
{
access = "Allow"
description = null
destination_address_prefix = "*"
destination_address_prefixes = []
destination_application_security_group_ids = []
destination_port_range = "5985"
destination_port_ranges = []
direction = "Inbound"
name = "rule2"
priority = 200
protocol = "Tcp"
source_address_prefix = "*"
source_address_prefixes = []
source_application_security_group_ids = []
source_port_range = "*"
source_port_ranges = []
},
]

azurerm_public_ip linux_pip:
resource "azurerm_public_ip" "linux_pip" {
allocation_method = "Dynamic"
ddos_protection_mode = "VirtualNetworkInherited"
edge_zone = null
id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/publicIPAddresses/lab03s2-db1-u-vm1-pip"
}

```

```

    "id": "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03/providers/Microsoft.Network/publicIPAddresses/lab03-pip",
    "ip_address": null,
    "ip_version": "IPv4",
    "location": "East US",
    "name": "lab03-pip",
    "resource_group_name": "lab03-rg",
    "sku": "Basic",
    "sku_tier": "Regional",
    "tags": {
        "ContactEmail": "rohachaudry@hotmail.com",
        "Environment": "Lab",
        "Name": "Terraform-Class",
        "Project": "Learning"
    }
}

# azurerm_resource_group.lab02_rg:
resource "azurerm_resource_group" "lab02_rg" {
    id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg"
    location = "eastus"
    managed_by = null
    name = "Lab02-rg"
}

# azurerm_resource_group.lab03_rg:
resource "azurerm_resource_group" "lab03_rg" {
    id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg"
    location = "eastus"
    managed_by = null
    name = "Lab03-rg"
}

# azurerm_subnet.lab02_subnets:
resource "azurerm_subnet" "lab02_subnet1" {
    address_prefixes = [
        "10.0.1.0/24",
    ]
    default_outbound_access_enabled = true
    id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet1"
    name = "Lab02-subnet1"
    private_endpoint_network_policies = "Disabled"
    private_link_service_network_policies_enabled = true
    resource_group_name = "Lab02-rg"
    virtual_network_name = "Lab02-vnet"
}

# azurerm_subnet.lab02_subnets:
resource "azurerm_subnet" "lab02_subnet2" {
    address_prefixes = [
        "10.0.2.0/24",
    ]
    default_outbound_access_enabled = true
    id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
    name = "Lab02-subnet2"
    private_endpoint_network_policies = "Disabled"
}

resource "azurerm_subnet" "lab03_subnet1" {
    address_prefixes = [
        "10.1.1.0/24",
    ]
    default_outbound_access_enabled = true
    id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet1"
    name = "Lab03-subnet1"
    private_endpoint_network_policies = "Disabled"
    private_link_service_network_policies_enabled = true
    resource_group_name = "Lab03-rg"
    virtual_network_name = "Lab03-vnet"
}

# azurerm_subnet.lab03_subnets:
resource "azurerm_subnet" "lab03_subnet2" {
    address_prefixes = [
        "10.1.2.0/24",
    ]
    default_outbound_access_enabled = true
    id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
    name = "Lab03-subnet2"
    private_endpoint_network_policies = "Disabled"
    private_link_service_network_policies_enabled = true
    resource_group_name = "Lab03-rg"
    virtual_network_name = "Lab03-vnet"
}

# azurerm_subnet_network_security_group_association.lab02_subnet2_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab02_subnet2_nsg_assoc" {
    id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
    network_security_group_id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg2"
    subnet_id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
}

# azurerm_subnet_network_security_group_association.lab02_subnet_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab02_subnet_nsg_assoc" {
    id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
    network_security_group_id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg1"
    subnet_id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
}

# azurerm_subnet_network_security_group_association.lab03_subnet_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab03_subnet_nsg_assoc" {
    id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet1"
    network_security_group_id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg1"
    subnet_id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet1"
}

# azurerm_subnet_network_security_group_association.lab03_subnet2_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab03_subnet2_nsg_assoc" {
    id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
    network_security_group_id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg2"
    subnet_id = "/subscriptions/9dffe749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
}

# azurerm_virtual_network.lab02_vnet:

```

```

resource "azurerm_subnet_network_security_group_association" "lab03_subnet2_nsg_assoc" {
  id          = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
  network_security_group_id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg2"
  subnet_id    = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
}

# azurerm_virtual_network.lab02_vnet:
resource "azurerm_virtual_network" "lab02_vnet" {
  address_space     = [
    "10.0.0.0/16",
  ]
  bgp_community      = null
  dns_servers        = []
  edge_zone          = null
  flow_timeout_in_minutes = 0
  guid               = "b1e713ef-e719-4cfb-a952-cdd181652e16"
  id                 = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet"
  location           = "West US"
  name               = "lab02-vnet"
  private_endpoint_vnet_policies = "Disabled"
  resource_group_name = "lab02-rg"
  subnet              = []
}

# azurerm_virtual_network.lab03_vnet:
resource "azurerm_virtual_network" "lab03_vnet" {
  address_space     = [
    "10.1.0.0/16",
  ]
  bgp_community      = null
  dns_servers        = []
  edge_zone          = null
  flow_timeout_in_minutes = 0
  guid               = "de788ba2-fa9a-47a0-af67-5d6e3164accd"
  id                 = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet"
  location           = "West US"
  name               = "lab03-vnet"
  private_endpoint_vnet_policies = "Disabled"
  resource_group_name = "lab03-rg"
  subnet              = []
}

n:\path\Semester\DevOps\Lab\scripts>

```

18. Log in to the Azure Portal. Navigate to the resource group and confirm all resources and tags exist as per specifications.

The screenshot shows the Microsoft Azure Resource groups page. At the top, there's a search bar and a Copilot button. Below the search bar, there are buttons for '+ Create', 'Manage view', 'Refresh', 'Export to CSV', 'Open query', and 'Assign tags'. A message indicates that a new version of the Browse experience is available. The main area displays a table of resource groups:

	Name	Subscription	Location
<input type="checkbox"/>	DefaultResourceGroup-EUS	... Azure for Students	East US
<input type="checkbox"/>	lab02-rg	... Azure for Students	East US
<input type="checkbox"/>	lab03-rg	... Azure for Students	East US
<input type="checkbox"/>	NetworkWatcherRG	... Azure for Students	East US

The screenshot shows the Microsoft Azure Resource groups page, specifically for the 'lab02-rg' resource group. The left sidebar shows a tree view of the resource group structure, with 'lab02-rg' selected. The main pane shows the 'Overview' tab selected under the 'Essentials' section. It includes sections for 'Resources' and 'Recommendations', with a table of resources:

	Type	Location	...
<input type="checkbox"/>	Name ↑	Type ↑	Location ↑
<input type="checkbox"/>	lab02-nsg1	Network security group	East US
<input type="checkbox"/>	lab02-nsg2	Network security group	East US
<input type="checkbox"/>	lab02-vnet	Virtual network	East US

The screenshot shows the Microsoft Azure Resource Groups page. The left sidebar lists resource groups: DefaultResourceGroup-EUS, lab02-rg, lab03-rg (selected), and NetworkWatcherRG. The main pane displays the 'lab03-rg' resource group details. Under the 'Overview' tab, there are sections for Activity log, Access control (IAM), Tags, Resource visualizer, Events, Settings (Deployments, Security, Deployment stacks, Policies, Properties, Locks), Cost Management, and Monitoring. The 'Resources' tab is selected, showing a table of resources with columns for Name, Type, and Location. The table includes entries for Network security group, Virtual network, Virtual machine, Network Interface, Disk, and Public IP address, all located in East US.

The screenshot shows the Microsoft Azure Tags page. The left sidebar lists tags: ContactEmail : rohachaudry@hotmail.com, Environment : Lab, Name : Terraform-Class, and Project : Learning. The main pane displays the 'Tags' page for the 'ContactEmail' tag, which has a value of 'rohachaudry@hotmail.com'. It shows a list of resources associated with this tag, including lab03s2-db1-u-vm1, lab03s2-db1-u-vm1-nic, lab03s2-db1-u-vm1-osdisk, and lab03s2-db1-u-vm1-pip, all located in East US.

The screenshot shows the Microsoft Azure Tags page for the 'ContactEmail' tag, filtered by 'Subscription equals all' (Azure for Students). The main pane displays a table of resources with columns for Name, Type, Resource group, Location, and Subscription. The table includes entries for Virtual machine, Network Interface, Disk, and Public IP address, all located in East US and associated with the 'Azure for Students' subscription.

20. Verify deletion:

```
D:\8th Semester\DevOps\lab03s3>terraform state list
D:\8th Semester\DevOps\lab03s3>terraform show
The state file is empty. No resources are represented.

D:\8th Semester\DevOps\lab03s3>
```

4. Open outputs03s4.tf in a text editor and define output blocks to display:

```
# b. Private IP Address
output "private_ip_address" {
    value      = azurerm_network_interface.linux_nic.private_ip_address
    description = "The private IP address of the VM"
}

# b. Public IP Address
output "public_ip_address" {
    value      = azurerm_public_ip.linux_pip.ip_address
    description = "The public IP address of the VM"
}

# c. Virtual Network Name
output "vnet_name" {
    value      = azurerm_virtual_network.lab03_vnet.name
    description = "The name of the virtual network"
}

# c. Virtual Network Address Space
output "vnet_address_space" {
    value      = azurerm_virtual_network.lab03_vnet.address_space
    description = "The address space of the virtual network"
}

# d. Subnet1 Name
output "subnet1_name" {
    value      = azurerm_subnet.lab03_subnet1.name
    description = "The name of subnet1"
}

# d. Subnet1 Address Prefix
output "subnet1_address_prefix" {
    value      = azurerm_subnet.lab03_subnet1.address_prefixes[0]
    description = "The address prefix of subnet1"
}

# d. Subnet2 Name
output "subnet2_name" {
    value      = azurerm_subnet.lab03_subnet2.name
    description = "The name of subnet2"
}

# d. Subnet2 Address Prefix
output "subnet2_address_prefix" {
    value      = azurerm_subnet.lab03_subnet2.address_prefixes[0]
    description = "The address prefix of subnet2"
}
```

7. Re-run validation until no errors are reported:

```
D:\8th Semester\DevOps\lab03s4>terraform validate
Success! The configuration is valid.
```

14. View and analyze state information:

```
D:\8th Semester\DevOps\lab03s4>terraform state list
azurerm_linux_virtual_machine.linux_vm
azurerm_network_interface.linux_nic
azurerm_network_security_group.lab02_nsg1
azurerm_network_security_group.lab02_nsg2
azurerm_network_security_group.lab03_nsg1
azurerm_network_security_group.lab03_nsg2
azurerm_public_ip.linux_pip
azurerm_resource_group.lab02_rg
azurerm_resource_group.lab03_rg
azurerm_subnet.lab02_subnet1
azurerm_subnet.lab02_subnet2
azurerm_subnet.lab03_subnet1
azurerm_subnet.lab03_subnet2
azurerm_subnet_network_security_group_association.lab02_subnet2_nsg_assoc
azurerm_subnet_network_security_group_association.lab02_subnet_nsg_assoc
azurerm_subnet_network_security_group_association.lab03_subnet1_nsg_assoc
azurerm_subnet_network_security_group_association.lab03_subnet2_nsg_assoc
azurerm_virtual_network.lab02_vnet
azurerm_virtual_network.lab03_vnet
```

```
D:\8th Semester\DevOps\lab03s4>
```

```
D:\8th Semester\DevOps\lab03s4>terraform show
# azurerm_linux_virtual_machine.linux_vm {
resource "azurerm_linux_virtual_machine" "linux_vm" {
  admin_username          = "hp-rohalaptop"
  allow_extension_operations = true
  availability_set_id      = null
  bypass_platform_safety_checks_on_user_schedule_enabled = false
  capacity_reservation_group_id = null
  computer_name            = "Lab03s2-dbl-u-vml"
  dedicated_host_group_id = null
  dedicated_host_id        = null
  disable_password_authentication = true
  disk_controller_type     = null
  eviction_policy          = false
  encryption_at_host_enabled = false
  eviction_policy          = null
  extensions_time_budget   = "PT1H30M"
  id                      = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Compute/virtualMachines/lab03s2-dbl-u-vml"
  license_type              = null
  location                 = "eastus"
  max_bid_price            = null
  name                     = "Lab03s2-dbl-u-vml"
  network_interface_ids    = [
    "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkInterfaces/lab03s2-dbl-u-vml-nic",
  ]
  patch_assessment_mode     = "ImageDefault"
  patch_mode                = "ImageDefault"
  platform_fault_domain     = -1
  priority                  = "Regular"
  private_ip_address         = "10.1.1.4"
  private_ip_addresses       = [
    "10.1.1.4",
  ]
  provision_ve_agent        = true
  proximity_placement_group_id = null
  public_ip_address          = "20.169.217.228"
  public_ip_addresses         = [
    "20.169.217.228",
  ]
  reboot_setting             = null
  resource_group_name        = "Lab03-rg"
  secure_boot_enabled        = false
  size                      = "Standard_B1s"
  source_image_id            = null
  tags                      = [
    "ContactEmail" = "rohachaudry@hotmail.com",
    "Environment"  = "Lab",
    "Name"         = "Terraform-Class",
    "Project"      = "Learning"
  ]
  user_data                 = null
}
```

```

    ]
    user_data = null
    virtual_machine_id = "f89d7105-2893-416e-8177-b1f2b0b240f6"
    vm_agent_platform_updates_enabled = null
    vtpm_enabled = false
    zone = null
  }
  admin_ssh_key {
    public_key = <>EOF
    public_key = AAAAB3NzaC1yc2EAAAQABAAQACQDIZ3e+3nhH2jY0HcyH2aFD2gE08+ZRNkbIDHhXkYaMgf12zHPcUxFg6Ab+wlDFKAUz/18zturzAf6BkDzLZLGtaGix2+JpHGVnUTrVvvpQgHtA2L4x0F7K8cg1PPYDzvgLwUpf3TnRBNyI8WrxzF3GSu0k6
    FUSAIQmJUWq789Ipw6AS0hkdqipENIrD4H+ePRDdWuW13a1BpYxx1kG72yU/hctkowdwFrosAlvtoslpfKzDl3Pj2ecXAcryogkTPj8vY3RjCUEcxpOTNqBL18x1bVYadOxSVhHMKUG2AJuX1b1z946ce1YRArudfVvK8qnp/OpP+516x3VtCt1679TVbTZ6CwD4qnt
    SZNx0zev8TaCju7fG6VrattyL1t6Sw/UVyDpx/A3exXjdpCgAtNTv95SNWx+916/tfLb12f9g6omhkg818V85HqC8Rs260vcy9g5xtScADPUAH2YnbfmFgStTuy00D81Y2Bu06IXFgtCnxz9gtQWhewinc2UyUgg2YD57XaiyghMsRoahikHfl8joWsokwhZddb2cCa1cgk1
    pc0UEbmlGHTch0te8IjGXjWib/MoMAXb835ntaPf/yk53QyBE4tEEElSzwiilfieYgog7bjba8Rt1A4FV88QAnQQ0cGztee1yRv+nxRlx4Eazw== hp@ROHALaptop
  }
  EOT
  username = "hp-rohalaptop"
}

os_disk {
  caching = "ReadWrite"
  disk_encryption_set_id = null
  disk_size_gb = 32
  id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Compute/disks/lab03s2-dbl-u-vm1-osdisk"
  name = "lab03s2-dbl-u-vm1-osdisk"
  secure_vm_disk_encryption_set_id = null
  security_encryption_type = null
  storage_account_type = "Premium_LRS"
  write_accelerator_enabled = false
}

source_image_reference {
  offer = "0001-com-ubuntu-server-jammy"
  publisher = "Canonical"
  sku = "22.04-lts"
  version = "latest"
}

# azurerm_network_interface.linux_nic:
resource "azurerm_network_interface" "linux_nic" {
  acceleratedNetworking_enabled = false
  applied_dns_servers = []
  auxiliary_mode = null
  auxiliary_sku = null
  edge_zone = null
  internal_dns_name_label = "subcriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkInterfaces/lab03s2-dbl-u-vm1-nic"
  internal_domain_name_suffix = "mu53st4pwqcezbpnjjzxfdjg.bx.internal.cloudapp.net"
  ip_forwarding_enabled = false
  location = "eastus"
  mac_address = null
  name = "lab03s2-dbl-u-vm1-nic"
  private_ip_address = "10.1.1.4"
  private_ip_addresses = ["10.1.1.4"]
}

]

resource_group_name = "lab03-rg"
tags = [
  "ContactEmail" = "rohachaudry@hotmail.com",
  "Environment" = "Lab",
  "Name" = "Terraform-Class",
  "Project" = "Learning"
]
virtual_machine_id = null

ip_configuration {
  gateway_load_balancer_frontend_ip_configuration_id = null
  name = "lab03s2-dbl-u-vm1-ipconfig1"
  primary = true
  private_ip_address = "10.1.1.4"
  private_ip_address_allocation = "Dynamic"
  private_ip_address_version = "IPv4"
  public_ip_address_id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/publicIPAddresses/lab03s2-dbl-u-vm1-pip"
  subnet_id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-subnet1"
}

# azurerm_network_security_group.lab02_nsg1:
resource "azurerm_network_security_group" "lab02_nsg1" {
  id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg1"
  location = "eastus"
  name = "lab02-nsg1"
  resource_group_name = "lab02-rg"
  security_rule = [
    {
      access = "Allow"
      destination = null
      destination_address_prefix = "*"
      destination_address_prefixes = []
      destination_application_security_group_ids = []
      destination_port_range = "22"
      destination_port_ranges = []
      direction = "Inbound"
      name = "rule1"
      priority = 100
      protocol = "TCP"
      source_address_prefix = "*"
      source_address_prefixes = []
      source_application_security_group_ids = []
      source_port_range = "*"
      source_port_ranges = []
    },
  ]
}

# azurerm_network_security_group.lab02_nsg2:
resource "azurerm_network_security_group" "lab02_nsg2" {
  id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg2"
  location = "eastus"
  name = "lab02-nsg2"
}

```

```

name          = "lab02-nsg2"
resource_group_name = "lab02-rg"
security_rule    = [
  {
    access                  = "Allow"
    description             = null
    destination_address_prefix = "*"
    destination_address_prefixes = []
    destination_application_security_group_ids = []
    destination_port_range     = "3389"
    destination_port_ranges   = []
    direction                = "Inbound"
    name                     = "rule1"
    priority                 = 100
    protocol                 = "Tcp"
    source_address_prefix     = "*"
    source_address_prefixes   = []
    source_application_security_group_ids = []
    source_port_range         = "*"
    source_port_ranges        = []
  },
  {
    access                  = "Allow"
    description             = null
    destination_address_prefix = "*"
    destination_address_prefixes = []
    destination_application_security_group_ids = []
    destination_port_range     = "5985"
    destination_port_ranges   = []
    direction                = "Inbound"
    name                     = "rule2"
    priority                 = 200
    protocol                 = "Tcp"
    source_address_prefix     = "*"
    source_address_prefixes   = []
    source_application_security_group_ids = []
    source_port_range         = "*"
    source_port_ranges        = []
  },
]
]

# azurerm_network_security_group.lab03_nsg1:
resource "azurerm_network_security_group" "lab03_nsg1" {
  id          = "$subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg1"
  location    = "eastus"
  name        = "Lab03-nsg1"
  resource_group_name = "lab03-rg"
  security_rule    = [
    {
      access                  = "Allow"
      description             = null
      destination_address_prefix = "*"
      destination_address_prefixes = []
      destination_application_security_group_ids = []
      destination_port_range     = "22"
      destination_port_ranges   = []
      direction                = "Inbound"
      name                     = "rule1"
      priority                 = 100
      protocol                 = "Tcp"
      source_address_prefix     = "*"
      source_address_prefixes   = []
      source_application_security_group_ids = []
      source_port_range         = "*"
      source_port_ranges        = []
    },
    {
      access                  = "Allow"
      description             = null
      destination_address_prefix = "*"
      destination_address_prefixes = []
      destination_application_security_group_ids = []
      destination_port_range     = "22"
      destination_port_ranges   = []
      direction                = "Inbound"
      name                     = "rule2"
      priority                 = 200
      protocol                 = "Tcp"
      source_address_prefix     = "*"
      source_address_prefixes   = []
      source_application_security_group_ids = []
      source_port_range         = "*"
      source_port_ranges        = []
    },
  ]
}

# azurerm_network_security_group.lab03_nsg2:
resource "azurerm_network_security_group" "lab03_nsg2" {
  id          = "$subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg2"
  location    = "eastus"
  name        = "Lab03-nsg2"
  resource_group_name = "lab03-rg"
  security_rule    = [
    {
      access                  = "Allow"
      description             = null
      destination_address_prefix = "*"
      destination_address_prefixes = []
      destination_application_security_group_ids = []
      destination_port_range     = "3389"
      destination_port_ranges   = []
      direction                = "Inbound"
      name                     = "rule1"
      priority                 = 100
      protocol                 = "Tcp"
      source_address_prefix     = "*"
      source_address_prefixes   = []
      source_application_security_group_ids = []
      source_port_range         = "*"
      source_port_ranges        = []
    },
    {
      access                  = "Allow"
      description             = null
      destination_address_prefix = "*"
      destination_address_prefixes = []
      destination_application_security_group_ids = []
      destination_port_range     = "5985"
      destination_port_ranges   = []
      direction                = "Inbound"
      name                     = "rule2"
      priority                 = 200
      protocol                 = "Tcp"
      source_address_prefix     = "*"
      source_address_prefixes   = []
      source_application_security_group_ids = []
      source_port_range         = "*"
      source_port_ranges        = []
    },
  ]
}

```

```

destination_application_security_group_ids = []
destination_port_range     = "22"
destination_port_ranges   = []
direction                = "Inbound"
name                     = "rule1"
priority                 = 100
protocol                 = "Tcp"
source_address_prefix     = "*"
source_address_prefixes   = []
source_application_security_group_ids = []
source_port_range         = "*"
source_port_ranges        = []
},
]

# azurerm_network_security_group.lab03_nsg2:
resource "azurerm_network_security_group" "lab03_nsg2" {
  id          = "$subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg2"
  location    = "eastus"
  name        = "Lab03-nsg2"
  resource_group_name = "lab03-rg"
  security_rule    = [
    {
      access                  = "Allow"
      description             = null
      destination_address_prefix = "*"
      destination_address_prefixes = []
      destination_application_security_group_ids = []
      destination_port_range     = "3389"
      destination_port_ranges   = []
      direction                = "Inbound"
      name                     = "rule1"
      priority                 = 100
      protocol                 = "Tcp"
      source_address_prefix     = "*"
      source_address_prefixes   = []
      source_application_security_group_ids = []
      source_port_range         = "*"
      source_port_ranges        = []
    },
    {
      access                  = "Allow"
      description             = null
      destination_address_prefix = "*"
      destination_address_prefixes = []
      destination_application_security_group_ids = []
      destination_port_range     = "5985"
      destination_port_ranges   = []
      direction                = "Inbound"
      name                     = "rule2"
      priority                 = 200
      protocol                 = "Tcp"
      source_address_prefix     = "*"
      source_address_prefixes   = []
      source_application_security_group_ids = []
      source_port_range         = "*"
      source_port_ranges        = []
    },
  ]
}

```

```

        source_port_range          = "*"
        source_port_ranges         = []
    },
}

# azurerm_public_ip_linux_pip:
resource "azurerm_public_ip" "linux_pip" {
    allocation_method          = "Dynamic"
    ddos_protection_mode      = "VirtualNetworkInherited"
    edge_zone                  = null
    id                         = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/publicIPAddresses/lab03s2-db1-u-vml-pip"
    idle_timeout_in_minutes    = null
    ip_address                 = "IPv4"
    location                   = "eastus"
    name                       = "Lab02-DB1-U-VML-Pip"
    resource_group_name        = "lab03-rg"
    sku                        = "Basic"
    sku_tier                  = "Regional"
    tags                       = [
        "ContactEmail" = "rochachaudry@hotmail.com",
        "Environment"  = "Lab",
        "Name"         = "Terraform-Class",
        "Project"     = "Learning"
    ]
}

# azurerm_resource_group.lab02_rg:
resource "azurerm_resource_group" "lab02_rg" {
    id                         = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg"
    location                   = "eastus"
    managed_by                 = null
    name                       = "Lab02-rg"
}

# azurerm_resource_group.lab03_rg:
resource "azurerm_resource_group" "lab03_rg" {
    id                         = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg"
    location                   = "eastus"
    managed_by                 = null
    name                       = "Lab03-rg"
}

# azurerm_subnet.lab02_subnet1:
resource "azurerm_subnet" "lab02_subnet1" {
    address_prefixes           = [
        "10.0.1.0/24",
    ]
    default_outbound_access_enabled = true
    id                         = "subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet1"
    name                       = "Lab02-subnet1"
    private_endpoint_network_policies = "Enabled"
    private_link_service_network_policies_enabled = true
    resource_group_name        = "Lab02-rg"
    virtual_network_name       = "Lab02-vnet"
}

virtual_network_name          = "Lab02-vnet"
}

# azurerm_subnet.lab02_subnet2:
resource "azurerm_subnet" "lab02_subnet2" {
    address_prefixes           = [
        "10.0.2.0/24",
    ]
    default_outbound_access_enabled = true
    id                         = "subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
    name                       = "Lab02-subnet2"
    private_endpoint_network_policies = "Disabled"
    private_link_service_network_policies_enabled = false
    resource_group_name        = "Lab02-rg"
    virtual_network_name       = "Lab02-vnet"
}

# azurerm_subnet.lab03_subnet1:
resource "azurerm_subnet" "lab03_subnet1" {
    address_prefixes           = [
        "10.1.1.0/24",
    ]
    default_outbound_access_enabled = true
    id                         = "subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet1"
    name                       = "Lab03-subnet1"
    private_endpoint_network_policies = "Disabled"
    private_link_service_network_policies_enabled = true
    resource_group_name        = "Lab03-rg"
    virtual_network_name       = "Lab03-vnet"
}

# azurerm_subnet.lab03_subnet2:
resource "azurerm_subnet" "lab03_subnet2" {
    address_prefixes           = [
        "10.1.2.0/24",
    ]
    default_outbound_access_enabled = true
    id                         = "subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
    name                       = "Lab03-subnet2"
    private_endpoint_network_policies = "Disabled"
    private_link_service_network_policies_enabled = true
    resource_group_name        = "Lab03-rg"
    virtual_network_name       = "Lab03-vnet"
}

# azurerm_subnet_network_security_group_association.lab02_subnet2_nsgr_assoc:
resource "azurerm_subnet_network_security_group_association" "lab02_subnet2_nsgr_assoc" {
    id                         = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
    network_security_group_id  = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsgr2"
    subnet_id                  = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
}

# azurerm_subnet_network_security_group_association.lab02_subnet1_nsgr_assoc:
resource "azurerm_subnet_network_security_group_association" "lab02_subnet1_nsgr_assoc" {
    id                         = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet1"
    network_security_group_id  = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsgr1"
}

```

```

    subnet_id      = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet1"
}

# azurerm_subnet_network_security_group_association.lab03_subnet1_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab03_subnet1_nsg_assoc" {
  id          = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet1"
  network_security_group_id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg1"
  subnet_id   = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet1"
}

# azurerm_subnet_network_security_group_association.lab03_subnet2_nsg_assoc:
resource "azurerm_subnet_network_security_group_association" "lab03_subnet2_nsg_assoc" {
  id          = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
  network_security_group_id = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/networkSecurityGroups/lab03-nsg2"
  subnet_id   = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03-rg/providers/Microsoft.Network/virtualNetworks/lab03-vnet/subnets/lab03-subnet2"
}

# azurerm_virtual_network.lab02_vnet:
resource "azurerm_virtual_network" "lab02_vnet" {
  address_space     = [
    "10.0.0.0/16",
  ]
  bgp_community     = null
  dns_servers       = []
  edge_zone         = null
  flow_timeout_in_minutes = 0
  id               = "a15ba67c-7cd6-48a6-bd72-d5c51127630a"
  location          = "eastus2"
  name              = "lab02-vnet"
  private_endpoint_vnet_policies = "Disabled"
  resource_group_name = "lab02-rg"
  subnet            = []
}

# azurerm_virtual_network.lab03_vnet:
resource "azurerm_virtual_network" "lab03_vnet" {
  address_space     = [
    "10.1.0.0/16",
  ]
  bgp_community     = null
  dns_servers       = []
  edge_zone         = null
  flow_timeout_in_minutes = 0
  id               = "4fd93f65-b4cf-4c04-85ed-ca539b96e34e"
  location          = "eastus"
  name              = "lab03-vnet"
  private_endpoint_vnet_policies = "Disabled"
  resource_group_name = "lab03-rg"
  subnet            = []
}

Outputs:

```

```

subnet
}

```

Outputs:

```

private_ip_address = "10.1.1.4"
public_ip_address = null
subnet1_address_prefix = "10.1.1.0/24"
subnet1_name = "lab03-subnet1"
subnet2_address_prefix = "10.1.2.0/24"
subnet2_name = "lab03-subnet2"
vm_hostname = "lab03s2-db1-u-vm1"
vnet_address_space = [
  "10.1.0.0/16",
]
vnet_name = "lab03-vnet"

```

15. Display output information:

```
D:\8th Semester\DevOps\lab03s4>terraform output
private_ip_address = "10.1.1.4"
public_ip_address = ""
subnet1_address_prefix = "10.1.1.0/24"
subnet1_name = "lab03-subnet1"
subnet2_address_prefix = "10.1.2.0/24"
subnet2_name = "lab03-subnet2"
vm_hostname = "lab03s2-db1-u-vm1"
vnet_address_space = toset([
  "10.1.0.0/16",
])
vnet_name = "lab03-vnet"
```

17. Verify deletion:

```
Destroy complete! Resources: 19 destroyed.

D:\8th Semester\DevOps\lab03s4>terraform state list

D:\8th Semester\DevOps\lab03s4>terraform show
The state file is empty. No resources are represented.
```

4. Open lab03s5.tf in a text editor and define an explicit dependency rule for the virtual machine to wait for the creation of the resource group.

```

# Public IP
resource "azurerm_public_ip" "linux_pip" {
  name                = "${var.linux_name}-pip"
  location            = azurerm_resource_group.lab03_rg.location
  resource_group_name = azurerm_resource_group.lab03_rg.name
  allocation_method   = "Dynamic"
  sku                 = "Basic"

  tags = {
    Name      = local.Name
    Project   = local.Project
    ContactEmail = local.ContactEmail
    Environment = local.Environment
  }
}

# Network Interface
resource "azurerm_network_interface" "linux_nic" {
  name                = "${var.linux_name}-nic"
  location            = azurerm_resource_group.lab03_rg.location
  resource_group_name = azurerm_resource_group.lab03_rg.name

  ip_configuration {
    name                  = "${var.linux_name}-ipconfig1"
    subnet_id             = azurerm_subnet.lab03_subnet1.id
    private_ip_address_allocation = "Dynamic"
    public_ip_address_id    = azurerm_public_ip.linux_pip.id
  }

  tags = {
    Name      = local.Name
    Project   = local.Project
    ContactEmail = local.ContactEmail
    Environment = local.Environment
  }
}

# Linux Virtual Machine
resource "azurerm_linux_virtual_machine" "linux_vm" {
  name                = var.linux_name
  location            = azurerm_resource_group.lab03_rg.location
  resource_group_name = azurerm_resource_group.lab03_rg.name
  size                = var.linux_vm_size
  admin_username       = var.admin_username
  network_interface_ids = [azurerm_network_interface.linux_nic.id]

  admin_ssh_key {
    username = var.admin_username
    public_key = file(var.public_key_path)
  }

  os_disk {
    caching           = var.os_disk_caching
    storage_account_type = var.os_disk_storage_account_type
    disk_size_gb     = var.os_disk_size_gb
    name              = "${var.linux_name}-osdisk"
  }

  source_image_reference {
    publisher = "Canonical"
    offer     = "0001-com-ubuntu-server-jammy"
    sku       = "22_04-lts"
    version   = "latest"
  }

  disable_password_authentication = true

  depends_on = [azurerm_resource_group.lab03_rg]

  tags = {
    Name      = local.Name
    Project   = local.Project
    ContactEmail = local.ContactEmail
    Environment = local.Environment
  }
}

```

7. Re-run validation until no errors are reported:

```
D:\8th Semester\DevOps\lab03s5>terraform validate
Success! The configuration is valid.
```

```
D:\8th Semester\DevOps\lab03s5>
```

16. Edit lab03s5.tf in a text editor and add a rule to prevent virtual machine, public IP, and network interface resources from removal (use lifecycle { prevent_destroy = true }).

o Observe the error message generated.

```
vnet_name      = "lab03s5_vnet"
vnet_id        = "d43a2a0c-1a2e-4f3a-8a2a-0a0a0a0a0a0a"
vnet_ip_prefix = "10.0.0.0/16"

ERROR: Instance cannot be destroyed
on lab03s5.tf line 47:
47: resource "azurerm_linux_virtual_machine" "linux_vm" {

Resource azurerm_linux_virtual_machine.linux_vm has lifecycle.prevent_destroy set, but the plan calls for this resource to be destroyed. To avoid this error and continue with the plan, either disable lifecycle.prevent_destroy or reduce the scope of the plan using the -target option.

D:\8th Semester\DevOps\lab03s5>
```

20. Edit lab03s5.tf in a text editor and add a rule to prevent tag updates to the virtual machine (use lifecycle { ignore_changes = [tags] }).

o Observe the dry run output.

```
Note: Objects have changed outside of Terraform
Terraform detected the following changes made outside of Terraform since the last "terraform apply" which may have affected this plan:

# azurerm_public_ip.linux_pip has changed
~ resource "azurerm_public_ip" "linux_pip" {
  ~ id          = "/subscriptions/9df1e749-10d1-4aed-ba5c-47ff3d61c5dc/resourceGroups/lab03s2-rg/providers/Microsoft.Network/publicIPAddresses/lab03s2-db1-u-vm1-pip"
  + ip_address   = "172.190.8.201"
  ~ name         = "lab03s2-db1-u-vm1-pip"
  ~ tags         = [
      "ContactEmail" = "rohachaudry@hotmail.com"
      "Environment"  = "Lab"
      "Name"          = "Terraform-Class"
      "Project"       = "Learning"
    ]
  # (9 unchanged attributes hidden)
}

Unless you have made equivalent changes to your configuration, or ignored the relevant attributes using ignore_changes, the following plan may include actions to undo or respond to these changes.

Changes to Outputs:
- public_ip_address  = "" -> "172.190.8.201"

You can apply this plan to save these new output values to the Terraform state, without changing any real infrastructure.

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.
Terraform will attempt to reapply this plan to correct the state.
```

23. Show dependency tree:

```

D:\8th Semester\DevOps\lab03s5>terraform graph
graph TD
    rankdir = "RL";
    node [shape = rect, fontname = "sans-serif"];
    "azurerm_linux_virtual_machine.linux_vm" [label="azurerm_linux_virtual_machine.linux_vm"];
    "azurerm_network_interface.linux_nic" [label="azurerm_network_interface.linux_nic"];
    "azurerm_network_security_group.lab02_nsg1" [label="azurerm_network_security_group.lab02_nsg1"];
    "azurerm_network_security_group.lab02_nsg2" [label="azurerm_network_security_group.lab02_nsg2"];
    "azurerm_network_security_group.lab03_nsg1" [label="azurerm_network_security_group.lab03_nsg1"];
    "azurerm_network_security_group.lab03_nsg2" [label="azurerm_network_security_group.lab03_nsg2"];
    "azurerm_public_ip.linux_ip" [label="azurerm_public_ip.linux_ip"];
    "azurerm_resource_group.lab02_rg" [label="azurerm_resource_group.lab02_rg"];
    "azurerm_resource_group.lab03_rg" [label="azurerm_resource_group.lab03_rg"];
    "azurerm_subnet.lab02_subnet1" [label="azurerm_subnet.lab02_subnet1"];
    "azurerm_subnet.lab02_subnet2" [label="azurerm_subnet.lab02_subnet2"];
    "azurerm_subnet.lab03_subnet1" [label="azurerm_subnet.lab03_subnet1"];
    "azurerm_subnet.lab03_subnet2" [label="azurerm_subnet.lab03_subnet2"];
    "azurerm_subnet.network_security_group_association.lab02_subnet2_nsg_assoc" [label="azurerm_subnet.network_security_group_association.lab02_subnet2_nsg_assoc"];
    "azurerm_subnet.network_security_group_association.lab02_subnet_nsg_assoc" [label="azurerm_subnet.network_security_group_association.lab02_subnet_nsg_assoc"];
    "azurerm_subnet.network_security_group_association.lab03_subnet1_nsg_assoc" [label="azurerm_subnet.network_security_group_association.lab03_subnet1_nsg_assoc"];
    "azurerm_subnet.network_security_group_association.lab03_subnet2_nsg_assoc" [label="azurerm_subnet.network_security_group_association.lab03_subnet2_nsg_assoc"];
    "azurerm_virtual_network.lab02_vnet" [label="azurerm_virtual_network.lab02_vnet"];
    "azurerm_virtual_network.lab03_vnet" [label="azurerm_virtual_network.lab03_vnet"];
    "azurerm_linux_virtual_machine.linux_vm" --> "azurerm_network_interface.linux_nic";
    "azurerm_network_interface.linux_nic" --> "azurerm_public_ip.linux_ip";
    "azurerm_resource_group.lab03_rg" --> "azurerm_subnet.lab03_subnet1";
    "azurerm_network_security_group.lab02_nsg1" --> "azurerm_resource_group.lab02_rg";
    "azurerm_network_security_group.lab02_nsg2" --> "azurerm_resource_group.lab02_rg";
    "azurerm_network_security_group.lab03_nsg1" --> "azurerm_resource_group.lab03_rg";
    "azurerm_network_security_group.lab03_nsg2" --> "azurerm_resource_group.lab03_rg";
    "azurerm_public_ip.linux_ip" --> "azurerm_resource_group.lab03_rg";
    "azurerm_subnet.lab02_subnet1" --> "azurerm_virtual_network.lab02_vnet";
    "azurerm_subnet.lab02_subnet2" --> "azurerm_virtual_network.lab02_vnet";
    "azurerm_subnet.lab03_subnet1" --> "azurerm_virtual_network.lab03_vnet";
    "azurerm_subnet.lab03_subnet2" --> "azurerm_virtual_network.lab03_vnet";
    "azurerm_subnet.network_security_group_association.lab02_subnet2_nsg_assoc" --> "azurerm_network_security_group.lab02_nsg2";
    "azurerm_subnet.network_security_group_association.lab02_subnet_nsg_assoc" --> "azurerm_subnet.lab02_subnet2";
    "azurerm_subnet.network_security_group_association.lab03_subnet_nsg_assoc" --> "azurerm_subnet.lab02_subnet1";
    "azurerm_subnet.network_security_group_association.lab03_subnet1_nsg_assoc" --> "azurerm_subnet.lab03_subnet1";
    "azurerm_subnet.network_security_group_association.lab03_subnet2_nsg_assoc" --> "azurerm_network_security_group.lab03_nsg2";
    "azurerm_virtual_network.lab02_vnet" --> "azurerm_resource_group.lab02_rg";
    "azurerm_virtual_network.lab03_vnet" --> "azurerm_resource_group.lab03_rg";
}

```

25. Verify deletion:

```

D:\8th Semester\DevOps\lab03s5>terraform state list
D:\8th Semester\DevOps\lab03s5>terraform show
The state file is empty. No resources are represented.

D:\8th Semester\DevOps\lab03s5>

```