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INTRODUCTION TO DEVOPS

Terraform Lab 03

Section 1 (Part 1 and 2):

```
# Variable for resource group name
variable "resource_group_name" {
  type    = string
  default = "lab02-rg"
}

# Variable for location
variable "location" {
  type    = string
  default = "eastus"
}

# Variable for virtual network name
variable "virtual_network_name" {
  type    = string
  default = "lab02-vnet"
}

# Variable for virtual network address space
variable "virtual_network_address_space" {
  type    = list(string)
  default = ["10.0.0.0/16"]
}

# Variable for subnet 1 name
variable "subnet1_name" {
  type    = string
  default = "lab02-subnet1"
}
```

```
File Edit Format View Help
# Variable for subnet 1 address space
variable "subnet1_address_space" {
    type    = list(string)
    default = ["10.0.1.0/24"]
}

# Variable for subnet 2 name
variable "subnet2_name" {
    type    = string
    default = "lab02-subnet2"
}

# Variable for subnet 2 address space
variable "subnet2_address_space" {
    type    = list(string)
    default = ["10.0.2.0/24"]
}

# Variable for network security group 1 name
variable "nsg1_name" {
    type    = string
    default = "lab02-nsg1"
}

# Variable for network security group 2 name
variable "nsg2_name" {
    type    = string
    default = "lab02-nsg2"
}

```

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Section 1 (Part 3):

```

File Edit Format View Help
# Resource group
resource "azurerm_resource_group" "lab02" {
  name      = var.resource_group_name
  location  = var.location
}

# Virtual network
resource "azurerm_virtual_network" "lab02" {
  name                = var.virtual_network_name
  address_space       = var.virtual_network_address_space
  location            = azurerm_resource_group.lab02.location
  resource_group_name = azurerm_resource_group.lab02.name
}

# Subnet 1 (original)
resource "azurerm_subnet" "lab02_subnet1" {
  name                = var.subnet1_name
  resource_group_name = azurerm_resource_group.lab02.name
  virtual_network_name = azurerm_virtual_network.lab02.name
  address_prefixes     = var.subnet1_address_space
}

# Subnet 2 (new)
resource "azurerm_subnet" "lab02_subnet2" {
  name                = var.subnet2_name
  resource_group_name = azurerm_resource_group.lab02.name
  virtual_network_name = azurerm_virtual_network.lab02.name
  address_prefixes     = var.subnet2_address_space
}

```

Section1 (Part 4 and 5):

```

Microsoft Windows [Version 10.0.19045.5737]
(c) Microsoft Corporation. All rights reserved.

C:\Users\wt\Desktop\DevOps\lab03s1>terraform init
Initializing the backend...
Initializing provider plugins...
- Finding latest version of hashicorp/azurerm...
- Installing hashicorp/azurerm v4.26.0...
- Installed hashicorp/azurerm v4.26.0 (signed by HashiCorp)
Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.

C:\Users\wt\Desktop\DevOps\lab03s1>terraform validate
Success! The configuration is valid.

C:\Users\wt\Desktop\DevOps\lab03s1>

```

Section (Part 6-9):

```
Apply complete! Resources: 6 added, 0 changed, 0 destroyed.
```

```
C:\Users\wt\Desktop\DevOps\lab03s1>terraform state list
azurerm_network_security_group.lab02_nsg2
azurerm_resource_group.lab02
azurerm_subnet.lab02_subnet1
azurerm_subnet.lab02_subnet2
azurerm_subnet_network_security_group_association.lab02_nsg2_assoc
azurerm_virtual_network.lab02
```

```
C:\Users\wt\Desktop\DevOps\lab03s1>terraform show
# azurerm_network_security_group.lab02_nsg2:
resource "azurerm_network_security_group" "lab02_nsg2" {
  id = "/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/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"
```

```
      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_subnet.lab02_subnet2:
resource "azurerm_subnet" "lab02_subnet2" {
  address_prefixes = [
    "10.0.2.0/24",
  ]
  default_outbound_access_enabled = true
  id = "/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/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_network_security_group_association.lab02_nsg2_assoc:
resource "azurerm_subnet_network_security_group_association" "lab02_nsg2_assoc" {
  id = "/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02_subnet2"
  network_security_group_id = "/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg2"
  subnet_id = "/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02_subnet2"
}

# azurerm_virtual_network.lab02:
resource "azurerm_virtual_network" "lab02" {
  address_space = [

```

```

    source_port_ranges = [
    ],
  ],
}

# azurerm_resource_group.lab02:
resource "azurerm_resource_group" "lab02" {
  id = "/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg"
  location = "eastus"
  managed_by = null
  name = "lab02-rg"
}

# azurerm_subnet.lab02_subnet1:
resource "azurerm_subnet" "lab02_subnet1" {
  address_prefixes = [
    "10.0.1.0/24",
  ]
  default_outbound_access_enabled = true
  id = "/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/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:

```

```

}

# azurerm_subnet.lab02_subnet2:
resource "azurerm_subnet" "lab02_subnet2" {
  address_prefixes = [
    "10.0.2.0/24",
  ]
  default_outbound_access_enabled = true
  id = "/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/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_network_security_group_association.lab02_nsg2_assoc:
resource "azurerm_subnet_network_security_group_association" "lab02_nsg2_assoc" {
  id = "/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
  network_security_group_id = "/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg2"
  subnet_id = "/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
}

# azurerm_virtual_network.lab02:
resource "azurerm_virtual_network" "lab02" {
  address_space = [

```

```

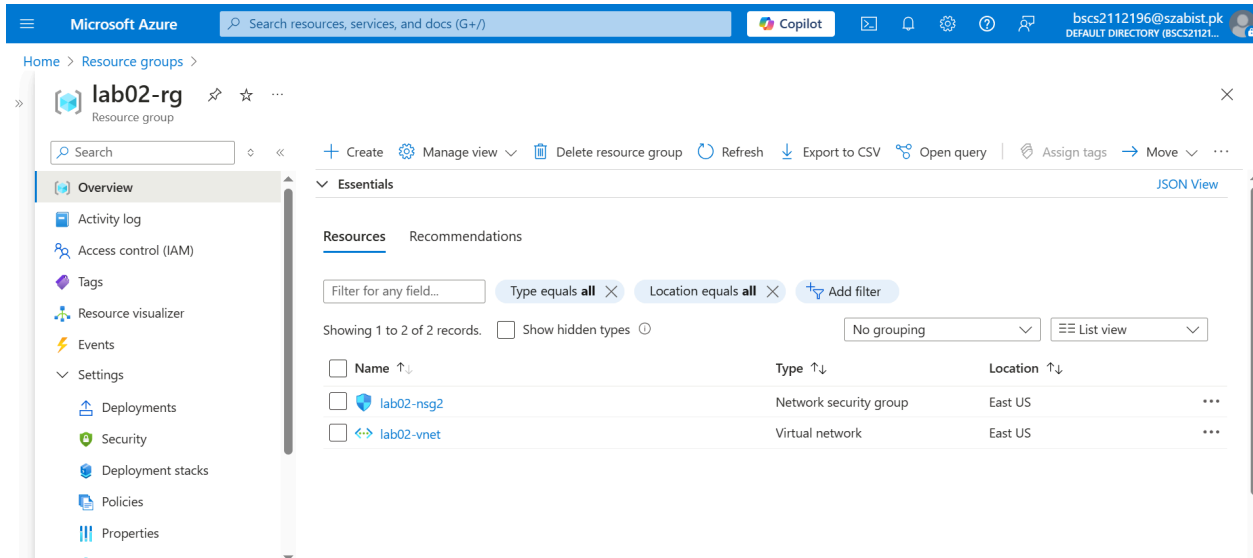
# azurerm_subnet_network_security_group_association.lab02_nsg2_assoc:
resource "azurerm_subnet_network_security_group_association" "lab02_nsg2_assoc" {
  id = "/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
  network_security_group_id = "/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg2"
  subnet_id = "/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2"
}

# azurerm_virtual_network.lab02:
resource "azurerm_virtual_network" "lab02" {
  address_space = [
    "10.0.0.0/16",
  ]
  bgp_community = null
  dns_servers = []
  edge_zone = null
  flow_timeout_in_minutes = 0
  guid = "304c3401-5df9-4c0f-9512-010d39d9ad5e"
  id = "/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/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 = []
}

```

C:\Users\wt\Desktop\DevOps\lab03s1>

Section 1 (Part 10) :



Section 1(Part 11):

```

-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet/subnets/lab02-subnet2]
azurermsubnet.lab02-subnet2: Destroying... [id=/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg2]
azurermsubnet.lab02-subnet2: Still destroying... [id=/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg/providers/Microsoft.Network/networkSecurityGroups/lab02-nsg2, 10s elapsed]
azurermsubnet.lab02-subnet2: Destruction complete after 12s
azurermsubnet.lab02-subnet2: Still destroying... [id=/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet]
azurermsubnet.lab02-subnet2: Destruction complete after 15s
azurermsubnet.lab02-subnet2: Still destroying... [id=/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg/providers/Microsoft.Network/virtualNetworks/lab02-vnet, 10s elapsed]
azurermsubnet.lab02-subnet2: Destruction complete after 15s
azurermsubnet.lab02-subnet2: Still destroying... [id=/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg, 10s elapsed]
azurermsubnet.lab02-subnet2: Destruction complete after 22s
azurermsubnet.lab02-subnet2: Still destroying... [id=/subscriptions/e6ca97d3-1564-4698-80f2-103d202390e0/resourceGroups/lab02-rg, 20s elapsed]
azurermsubnet.lab02-subnet2: Destruction complete after 22s
Destroy complete! Resources: 6 destroyed.

C:\Users\wt\Desktop\DevOps\lab03s1>terraform state list

C:\Users\wt\Desktop\DevOps\lab03s1>terraform show
The state file is empty. No resources are represented.

C:\Users\wt\Desktop\DevOps\lab03s1>

```

Section 2 (Part 1-2):

```
# Variable for Linux virtual machine name
variable "linux_name" {
  type    = string
  default = "lab03s2-db1-u-vm1"
}

# Variable for VM size
variable "vm_size" {
  type    = string
  default = "Standard_B1s"
}

# Variable for admin user name
variable "admin_username" {
  type    = string
  default = "<Sameer-2112196>"
}

# Variable for the public SSH key path
variable "public_key" {
  type    = string
  default = "C:\\Users\\wt\\.ssh\\id_rsa.pub"
}

# OS disk attributes
variable "os_disk_storage_account_type" {
  type    = string
  default = "Premium_LRS"
}
```

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```
variable "os_disk_size" {
  type    = number
  default = 32
}

variable "os_disk_caching" {
  type    = string
  default = "ReadWrite"
}

# Ubuntu Linux OS information
variable "ubuntu_publisher" {
  type    = string
  default = "Canonical"
}

variable "ubuntu_offer" {
  type    = string
  default = "UbuntuServer"
}

variable "ubuntu_sku" {
  type    = string
  default = "19.04"
}

variable "ubuntu_version" {
  type    = string
  default = "latest"
}
```

Section 2 (Part 3):

File Edit Format View Help

```
# Define the network interface
resource "azurerm_network_interface" "linux_nic" {
  name           = "${var.linux_name}-nic"
  location       = azurerm_resource_group.lab02.location
  resource_group_name = azurerm_resource_group.lab02.name

  # Define IP configuration for the NIC
  ip_configuration {
    name                 = "${var.linux_name}-ipconfig1"
    subnet_id           = azurerm_subnet.lab02_subnet1.id
    private_ip_address_allocation = "Dynamic"
    public_ip_address_id = azurerm_public_ip.linux_pip.id
  }
}

# Define the public IP address
resource "azurerm_public_ip" "linux_pip" {
  name           = "${var.linux_name}-pip"
  location       = azurerm_resource_group.lab02.location
  resource_group_name = azurerm_resource_group.lab02.name
  allocation_method = "Dynamic"
}

# Define the Linux virtual machine
resource "azurerm_linux_virtual_machine" "linux_vm" {
  name                 = var.linux_name
  resource_group_name = azurerm_resource_group.lab02.name
  location             = azurerm_resource_group.lab02.location
  size                = var.vm_size
```

File Edit Format View Help

```
# Define the Linux virtual machine
resource "azurerm_linux_virtual_machine" "linux_vm" {
  name                 = var.linux_name
  resource_group_name = azurerm_resource_group.lab02.name
  location             = azurerm_resource_group.lab02.location
  size                = var.vm_size
  admin_username      = var.admin_username
  network_interface_ids = [
    azurerm_network_interface.linux_nic.id,
  ]

  # Define the OS disk
  os_disk {
    name           = "${var.linux_name}-osdisk"
    caching        = var.os_disk_caching
    storage_account_type = var.os_disk_storage_account_type
    disk_size_gb   = var.os_disk_size
  }

  # Specify the Ubuntu image
  source_image_reference {
    publisher = var.ubuntu_publisher
    offer     = var.ubuntu_offer
    sku       = var.ubuntu_sku
    version   = var.ubuntu_version
  }

  # Define the SSH public key for login
  admin_ssh_key {
    username   = var.admin_username
    public_key = file(var.public_key)
  }
}
```

Section 2 (Part 4-5):

Microsoft Windows [Version 10.0.19045.5737]
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C:\Users\wt\Desktop\DevOps\lab03s2>terraform init

Initializing the backend...

Initializing provider plugins...

- Finding latest version of hashicorp/azurerm...

- Installing hashicorp/azurerm v4.26.0...

- Installed hashicorp/azurerm v4.26.0 (signed by HashiCorp)

Terraform has created a lock file .terraform.lock.hcl to record the provider selections it made above. Include this file in your version control repository so that Terraform can guarantee to make the same selections by default when you run "terraform init" in the future.

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see any changes that are required for your infrastructure. All Terraform commands should now work.

If you ever set or change modules or backend configuration for Terraform, rerun this command to reinitialize your working directory. If you forget, other commands will detect it and remind you to do so if necessary.

C:\Users\wt\Desktop\DevOps\lab03s2>terraform validate

Success! The configuration is valid.

C:\Users\wt\Desktop\DevOps\lab03s2>|