Міністерство освіти і науки України
Карпатський національний університет
імені В.Стефаника

Факультет математики та інформатики
Кафедра інформаційних технологій

Хмарні технології

Практична робота №8

Тема: Manage Virtual Machines

Мета: Порівняти віртуальні машини і набори масштабування віртуальних машин

Виконав: Андрусяк І.Р.
Група ІПЗ-41
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Викладач: Поварчук Д.Д.

Івано-Франківськ — 2025

providers.tf

```
terraform {
  required_version = ">= 1.0.0"
  required_providers {
    azurerm = {
      source  = "hashicorp/azurerm"
      version = "~> 3.0"
    }
  }
}

provider "azurerm" {
  subscription_id = "xxx-xxx-xxx-xxx"
  features {
    virtual_machine {
      delete_os_disk_on_deletion     = true
      skip_shutdown_and_force_delete = false
    }
  }
}
```

main.tf

```
resource "azurerm_resource_group" "rg" {
  name     = var.resource_group_name
  location = var.location
}

resource "azurerm_virtual_network" "vnet1" {
  name                = "az104-vnet1"
  address_space       = ["10.81.0.0/16"]
  location            = azurerm_resource_group.rg.location
  resource_group_name = azurerm_resource_group.rg.name
}

resource "azurerm_subnet" "subnet1" {
  name                 = "subnet1"
  resource_group_name  = azurerm_resource_group.rg.name
  virtual_network_name = azurerm_virtual_network.vnet1.name
  address_prefixes     = ["10.81.0.0/24"]
}
```

```
resource "azurerm_network_interface" "vm_nics" {
  count               = 2
  name                = "az104-nic${count.index + 1}"
  location            = azurerm_resource_group.rg.location
  resource_group_name = azurerm_resource_group.rg.name

  ip_configuration {
    name                          = "internal"
    subnet_id                     = azurerm_subnet.subnet1.id
    private_ip_address_allocation = "Dynamic"
  }
}

resource "azurerm_windows_virtual_machine" "vms" {
  count               = 2
  name                = "az104-vm${count.index + 1}"
  resource_group_name = azurerm_resource_group.rg.name
  location            = azurerm_resource_group.rg.location
  size                = "Standard_D2s_v3"
  admin_username      = var.admin_username
  admin_password      = var.admin_password
  zone                = count.index + 1
  network_interface_ids = [azurerm_network_interface.vm_nics[count.index].id]

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

```
    source_image_reference {
      publisher = "MicrosoftWindowsServer"
      offer     = "WindowsServer"
      sku       = "2019-Datacenter"
      version   = "latest"
    }
  }

  resource "azurerm_virtual_network" "vmss_vnet" {
    name                = "vmss-vnet"
    address_space       = ["10.82.0.0/20"]
    location            = azurerm_resource_group.rg.location
    resource_group_name = azurerm_resource_group.rg.name
  }

  resource "azurerm_subnet" "vmss_subnet" {
    name                 = "subnet0"
    resource_group_name  = azurerm_resource_group.rg.name
    virtual_network_name = azurerm_virtual_network.vmss_vnet.name
    address_prefixes     = ["10.82.0.0/24"]
  }

  resource "azurerm_public_ip" "vmss_lb_pip" {
    name                = "vmss-lb-pip"
    location            = azurerm_resource_group.rg.location
    resource_group_name = azurerm_resource_group.rg.name
    allocation_method   = "Static"
    sku                 = "Standard"
  }
```

```
resource "azurerm_lb" "vmss_lb" {
  name                = "vmss-lb"
  location            = azurerm_resource_group.rg.location
  resource_group_name = azurerm_resource_group.rg.name
  sku                 = "Standard"

  frontend_ip_configuration {
    name                 = "PublicIPAddress"
    public_ip_address_id = azurerm_public_ip.vmss_lb_pip.id
  }
}

resource "azurerm_windows_virtual_machine_scale_set" "vmss" {
  name                = "vmss1"
  resource_group_name = azurerm_resource_group.rg.name
  location            = azurerm_resource_group.rg.location
  sku                 = "Standard_D2s_v3"
  instances           = 2
  admin_password      = var.admin_password
  admin_username      = var.admin_username
  zones               = ["1", "2", "3"]

  source_image_reference {
    publisher = "MicrosoftWindowsServer"
    offer     = "WindowsServer"
    sku       = "2019-Datacenter"
    version   = "latest"
  }
```

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

    network_interface {
      name    = "vmss-nic"
      primary = true

      ip_configuration {
        name      = "internal"
        primary   = true
        subnet_id = azurerm_subnet.vmss_subnet.id
      }
    }
  }

  resource "azurerm_monitor_autoscale_setting" "vmss_autoscale" {
    name                = "vmss-autoscale"
    resource_group_name = azurerm_resource_group.rg.name
    location            = azurerm_resource_group.rg.location
    target_resource_id  = azurerm_windows_virtual_machine_scale_set.vmss.id

    profile {
      name = "defaultProfile"
      capacity {
        default = 2
        minimum = 2
        maximum = 10
      }
```

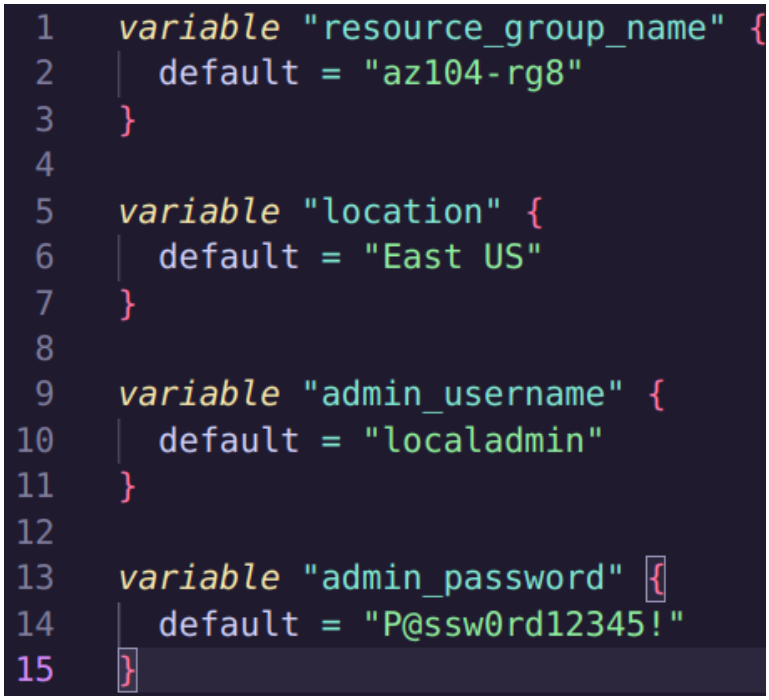
```
    rule {
      metric_trigger {
        metric_name        = "Percentage CPU"
        metric_resource_id = azurerm_windows_virtual_machine_scale_set.vmss.id
        time_grain         = "PT1M"
        statistic          = "Average"
        time_window        = "PT10M"
        time_aggregation   = "Average"
        operator           = "GreaterThan"
        threshold          = 70
      }
      scale_action {
        direction = "Increase"
        type      = "PercentChangeCount"
        value     = "50"
        cooldown  = "PT5M"
      }
    }

    rule {
      metric_trigger {
        metric_name        = "Percentage CPU"
        metric_resource_id = azurerm_windows_virtual_machine_scale_set.vmss.id
        time_grain         = "PT1M"
        statistic          = "Average"
        time_window        = "PT10M"
        time_aggregation   = "Average"
        operator           = "LessThan"
        threshold          = 30
```

```
    rule {
      metric_trigger {
        metric_name        = "Percentage CPU"
        metric_resource_id = azurerm_windows_virtual_machine_scale_set.vmss.id
        time_grain         = "PT1M"
        statistic          = "Average"
        time_window        = "PT10M"
        time_aggregation   = "Average"
        operator           = "LessThan"
        threshold          = 30
      }
      scale_action {
        direction = "Decrease"
        type      = "PercentChangeCount"
        value     = "50"
        cooldown  = "PT5M"
      }
    }
  }
}
```

outputs.tf

```
output "vm1_id" { value = azurerm_windows_virtual_machine.vms[0].id }
output "vmss_id" { value = azurerm_windows_virtual_machine_scale_set.vmss.id }
```

variables.tf



Висновок

Було зроблено ще одну лабораторну. На цьому по суті все.
Гітхаб: https://github.com/Illoizaur/azure_labs/tree/main/lab8