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

Факультет математики та інформатики
Кафедра інформаційних технологій

Хмарні технології

Практична робота №3

Тема: Manage Azure resources by using Azure Resource Manager Templates

Мета: Навчитися автоматизувати розгортання ресурсів

Виконав: Андрусяк І.Р.
Група ІПЗ-41
Дата: 25 листопада 2025р.
Викладач: Поварчук Д.Д.

Івано-Франківськ — 2025

Task 1: Створення керованого диску через Terraform

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

resource "azurerm_managed_disk" "disk1" {
  name                 = var.disk_name
  location             = azurerm_resource_group.rg.location
  resource_group_name  = azurerm_resource_group.rg.name
  storage_account_type = var.storage_account_type
  create_option        = "Empty"
  disk_size_gb         = var.disk_size_gb

  tags = {
    environment = "lab"
    task        = "task1"
  }
}
```

File: main.tf

```hcl
output "disk_id" {
  value = azurerm_managed_disk.disk1.id
}

output "disk_name" {
  value = azurerm_managed_disk.disk1.name
}

output "resource_group_name" {
  value = azurerm_resource_group.rg.name
}
```

File: outputs.tf

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

provider "azurerm" {
  features {}
}
```

File: providers.tf


```json
{
  "creationData": {
    "createOption": "Empty"
  },
  "diskIOPSReadWrite": 500,
  "diskMBpsReadWrite": 60,
  "diskSizeBytes": 34359738368,
  "diskSizeGB": 32,
  "diskState": "Unattached",
  "encryption": {
    "type": "EncryptionAtRestWithPlatformKey"
  },
  "id": "/subscriptions/16763438-d8c0-4e82-b6b9-1c54738e6db3/resourceGroups/az104-rg3/providers/Microsoft.Compute/disks/az104-disk1",
  "location": "eastus",
  "name": "az104-disk1",
  "networkAccessPolicy": "AllowAll",
  "optimizedForFrequentAttach": false,
  "provisioningState": "Succeeded",
  "publicNetworkAccess": "Enabled",
  "resourceGroup": "az104-rg3",
  "sku": {
    "name": "Standard_LRS",
    "tier": "Standard"
  },
  "tags": {
    "environment": "lab",
    "task": "task1"
  },
  "timeCreated": "2025-11-25T17:11:44.1983519+00:00",
  "type": "Microsoft.Compute/disks",
  "uniqueId": "abd7b8c6-7a5c-4028-af4a-25b42de479d7"
}
```


File: disk-template.json

```json
{
  "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemple.json#",
  "contentVersion": "1.0.0.0",
  "parameters": {
    "disks_az104_disk1_name": {
      "type": "String"
    }
  },
  "resources": [
    {
      "apiVersion": "2025-01-02",
      "location": "eastus",
      "name": "[parameters('disks_az104_disk1_name')]",
      "properties": {
        "creationData": {
          "createOption": "Empty"
        },
        "diskIOPSReadWrite": 500,
        "diskMBpsReadWrite": 60,
        "diskSizeGB": 32,
        "encryption": {
          "type": "EncryptionAtRestWithPlatformKey"
        },
        "networkAccessPolicy": "AllowAll",
        "optimizedForFrequentAttach": false,
        "publicNetworkAccess": "Enabled"
      },
      "sku": {
        "name": "Standard_LRS",
        "tier": "Standard"
      },
      "tags": {
        "environment": "lab",
        "task": "task1"
      },
      "type": "Microsoft.Compute/disks"
    }
  ],
  "variables": {}
}
```

File: export-template.json

Task 2: Редагування та повторне розгортання шаблону через Terraform

```hcl
data "azurerm_resource_group" "existing" {
  name = var.resource_group_name
}

resource "azurerm_managed_disk" "disk2" {
  name                 = var.disk_name
  location             = data.azurerm_resource_group.existing.location
  resource_group_name  = data.azurerm_resource_group.existing.name
  storage_account_type = var.storage_account_type
  create_option        = "Empty"
  disk_size_gb         = var.disk_size_gb

  tags = {
    environment = "lab"
    task        = "task2"
  }
}
```

File: main.tf

```hcl
output "disk_id" {
  value = azurerm_managed_disk.disk2.id
}

output "disk_name" {
  value = azurerm_managed_disk.disk2.name
}
```

File: outputs.tf

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

provider "azurerm" {
  features {}
}
```

File: providers.tf

```hcl
variable "resource_group_name" {
  default = "az104-rg3"
}

variable "location" {
  default = "East US"
}

variable "disk_name" {
  default = "az104-disk2"
}

variable "disk_size_gb" {
  default = 32
}

variable "storage_account_type" {
  default = "Standard_LRS"
}
```

File: variables.tf

Task 3: Розгортання шаблону через Terraform (замість PowerShell)

```hcl
data "azurerm_resource_group" "existing" {
  name = var.resource_group_name
}

resource "azurerm_managed_disk" "disk3" {
  name                 = var.disk_name
  location             = data.azurerm_resource_group.existing.location
  resource_group_name  = data.azurerm_resource_group.existing.name
  storage_account_type = var.storage_account_type
  create_option        = "Empty"
  disk_size_gb         = var.disk_size_gb

  tags = {
    environment = "lab"
    task        = "task3"
  }
}
```

File: main.tf

```hcl
output "disk_id" {
  value = azurerm_managed_disk.disk3.id
}

output "disk_name" {
  value = azurerm_managed_disk.disk3.name
}
```

File: outputs.tf

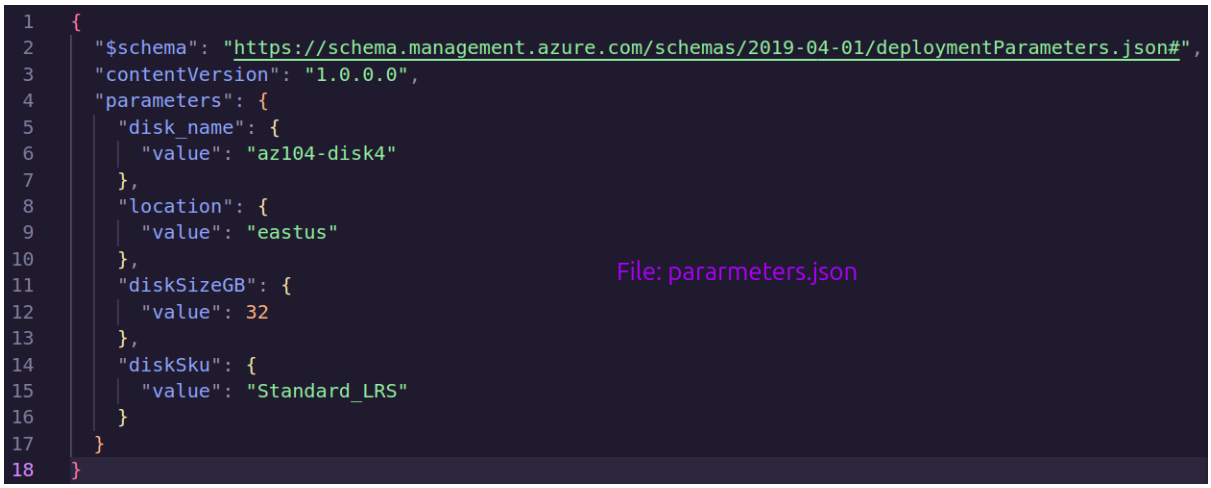
```hcl
terraform {
  required_providers {
    azurerm = {
      source  = "hashicorp/azurerm"
      version = "~>3.0"
    }
  }
}

provider "azurerm" {
  features {}
}
```

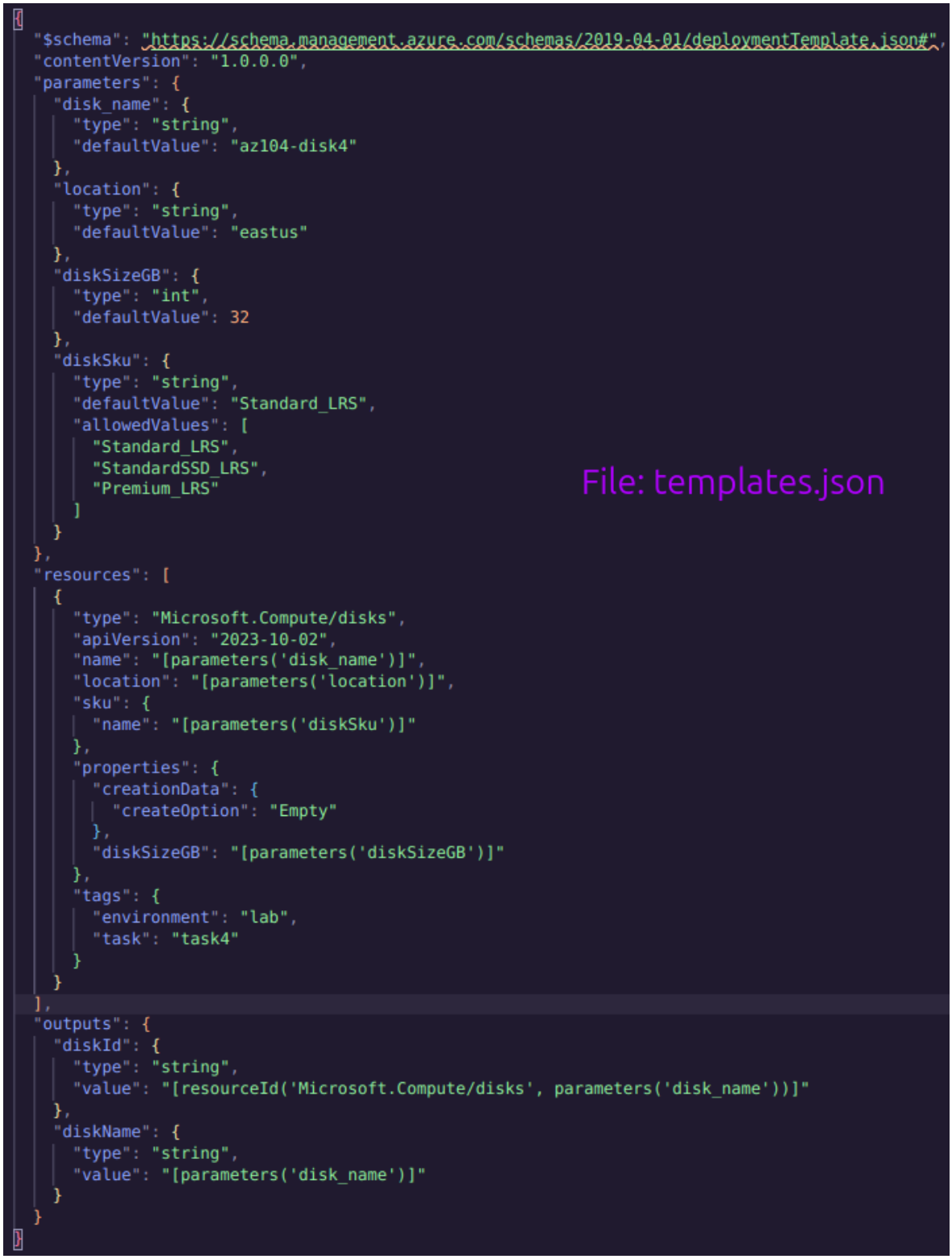
File: providers.tf

```hcl
variable "resource_group_name" {
  default = "az104-rg3"
}

variable "location" {
  default = "East US"
}

variable "disk_name" {
  default = "az104-disk3"
}

variable "disk_size_gb" {
  default = 32
}

variable "storage_account_type" {
  default = "Standard_LRS"
}
```

File: variables.tf

Task 4: Розгортання ARM шаблону через Azure CLI






```
{
  "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
  "contentVersion": "1.0.0.0",
  "parameters": {
    "disk_name": {
      "type": "string",
      "defaultValue": "az104-disk4"
    },
    "location": {
      "type": "string",
      "defaultValue": "eastus"
    },
    "diskSizeGB": {
      "type": "int",
      "defaultValue": 32
    },
    "diskSku": {
      "type": "string",
      "defaultValue": "Standard_LRS",
      "allowedValues": [
        "Standard_LRS",
        "StandardSSD_LRS",
        "Premium_LRS"
      ]
    }
  },
  "resources": [
    {
      "type": "Microsoft.Compute/disks",
      "apiVersion": "2023-10-02",
      "name": "[parameters('disk_name')]",
      "location": "[parameters('location')]",
      "sku": {
        "name": "[parameters('diskSku')]"
      },
      "properties": {
        "creationData": {
          "createOption": "Empty"
        },
        "diskSizeGB": "[parameters('diskSizeGB')]"
      },
      "tags": {
        "environment": "lab",
        "task": "task4"
      }
    }
  ],
  "outputs": {
    "diskId": {
      "type": "string",
      "value": "[resourceId('Microsoft.Compute/disks', parameters('disk_name'))]"
    },
    "diskName": {
      "type": "string",
      "value": "[parameters('disk_name')]"
    }
  }
}
```

Task 5: Розгортання ресурсу через Azure Bicep

lab3 > task5 > azuredeploydisk.bicep

```bicep
@description('Name of the managed disk')
param managedDiskName string = 'az104-disk5'

@description('Location for the disk')
param location string = resourceGroup().location

@description('Size of the disk in GB')
param diskSizeinGiB int = 32

@description('Storage account type for the disk')
@allowed([
  'Standard_LRS'
  'StandardSSD_LRS'
  'Premium_LRS'
])
param diskSku string = 'StandardSSD_LRS'

resource managedDisk 'Microsoft.Compute/disks@2023-10-02' = {
  name: managedDiskName
  location: location
  sku: {
    name: diskSku
  }
  properties: {
    creationData: {
      createOption: 'Empty'
    }
    diskSizeGB: diskSizeinGiB
  }
  tags: {
    environment: 'lab'
    task: 'task5'
  }
}

output diskId string = managedDisk.id
output diskName string = managedDisk.name
output diskSizeGB int = managedDisk.properties.diskSizeGB
```

```
illoi@illoi-Aspire-A715-42G:~/study/azure_labs/lab3/task5$ az disk list --resource-group az104-rg3 --output table
Name         ResourceGroup    Location    Zones    Sku              SizeGb    ProvisioningState
-----------  ---------------  ----------  -------  ---------------  --------  -------------------
az104-disk1  az104-rg3        eastus               Standard_LRS     32        Succeeded
az104-disk2  az104-rg3        eastus               Standard_LRS     32        Succeeded
az104-disk3  az104-rg3        eastus               Standard_LRS     32        Succeeded
az104-disk4  az104-rg3        eastus               Standard_LRS     32        Succeeded
az104-disk5  az104-rg3        eastus               StandardSSD_LRS  32        Succeeded
```

Висновок

Було зроблено ще одну лабораторну. На цьому по суті все.
Гітхаб: https://github.com/Illoizaur/azure_labs/tree/main/lab3