

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

Факультет математики та інформатики
Кафедра інформаційних технологій

Інформатика і програмування

Лабораторна робота № 7

Тема: Керування сховищем Azure

Виконав: Федірко А.Р

Група ПЗ-43

Дата: 13 жовтня 2025р.

Викладач: Поварчук Д.Д

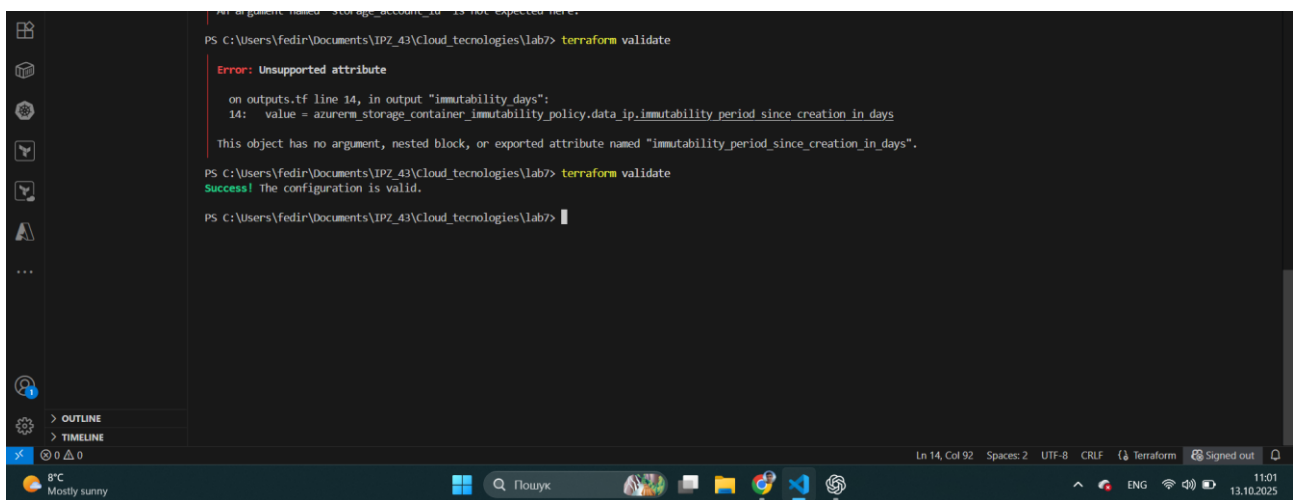
Івано-Франківськ – 2025

Лабораторний сценарій

Ваша організація зараз зберігає дані в локальних сховищах даних. До більшості цих файлів нечасто звертаються. Ви хочете мінімізувати вартість зберігання, розмістивши рідко використовувані файли в дешевших сховищах. Ви також плануєте дослідити різні механізми захисту, які пропонує Azure Storage, включаючи доступ до мережі, автентифікацію, авторизацію та реплікацію. Нарешті, ви хочете визначити, наскільки Azure Files підходить для розміщення ваших локальних файлових ресурсів.

Знову я і знову воно якось важко далось але я всеодно все задеплоїв

Отож, скрін команди terraform plan та terraform validate

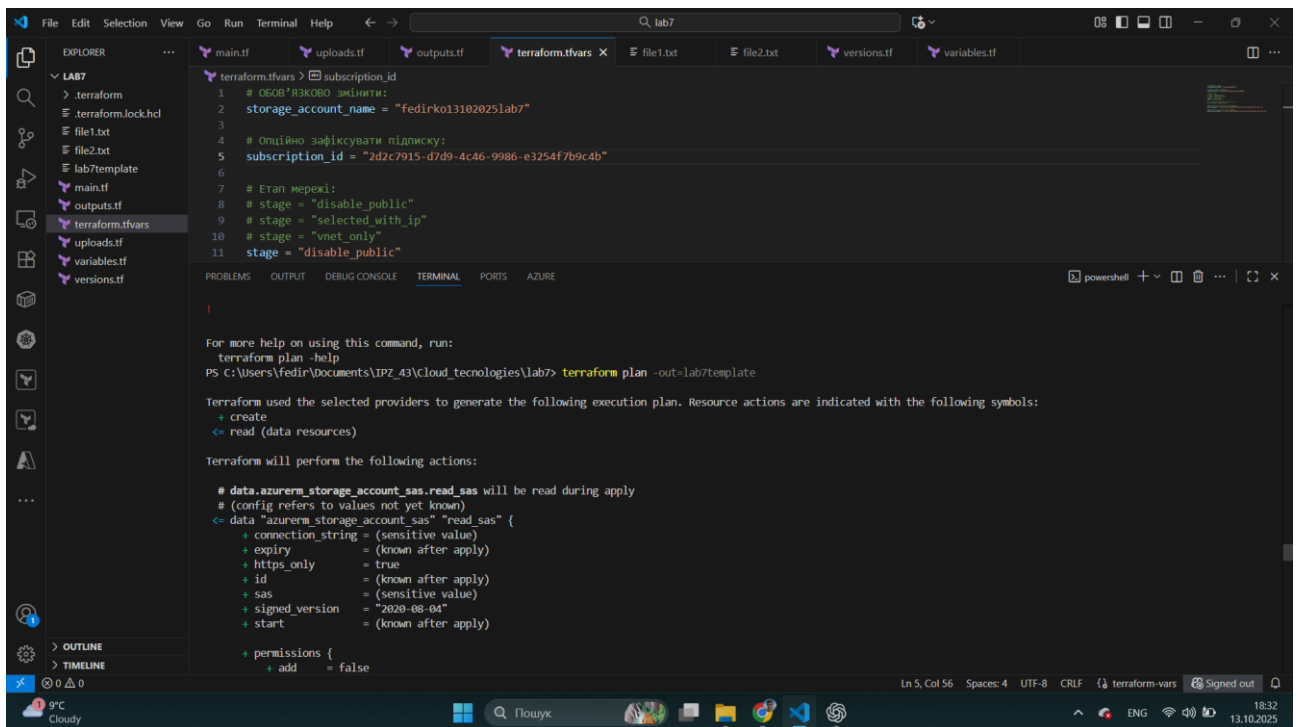


```
PS C:\Users\fedir\Documents\IPZ_43\Cloud_tecnologies\lab7> terraform validate
Error: Unsupported attribute
  on outputs.tf line 14, in output "immutability_days":
  14:   value = azure_rm_storage_container_immutability_policy.data_ip.immutability_period_since_creation_in_days

This object has no argument, nested block, or exported attribute named "immutability_period_since_creation_in_days".

PS C:\Users\fedir\Documents\IPZ_43\Cloud_tecnologies\lab7> terraform validate
Success! The configuration is valid.

PS C:\Users\fedir\Documents\IPZ_43\Cloud_tecnologies\lab7>
```



```
terraform.tfvars > subscription_id
1 # 0608183080 змінивши:
2 storage_account_name = "fedirko13102025lab7"
3
4 # Опціїю зафіксувати підписку:
5 subscription_id = "2d2c7915-d7d9-4c46-9986-e3254f7b9c4b"
6
7 # Еран мепеки:
8 # stage = "disable_public"
9 # stage = "selected_with_ip"
10 # stage = "vnet_only"
11 stage = "disable_public"
```

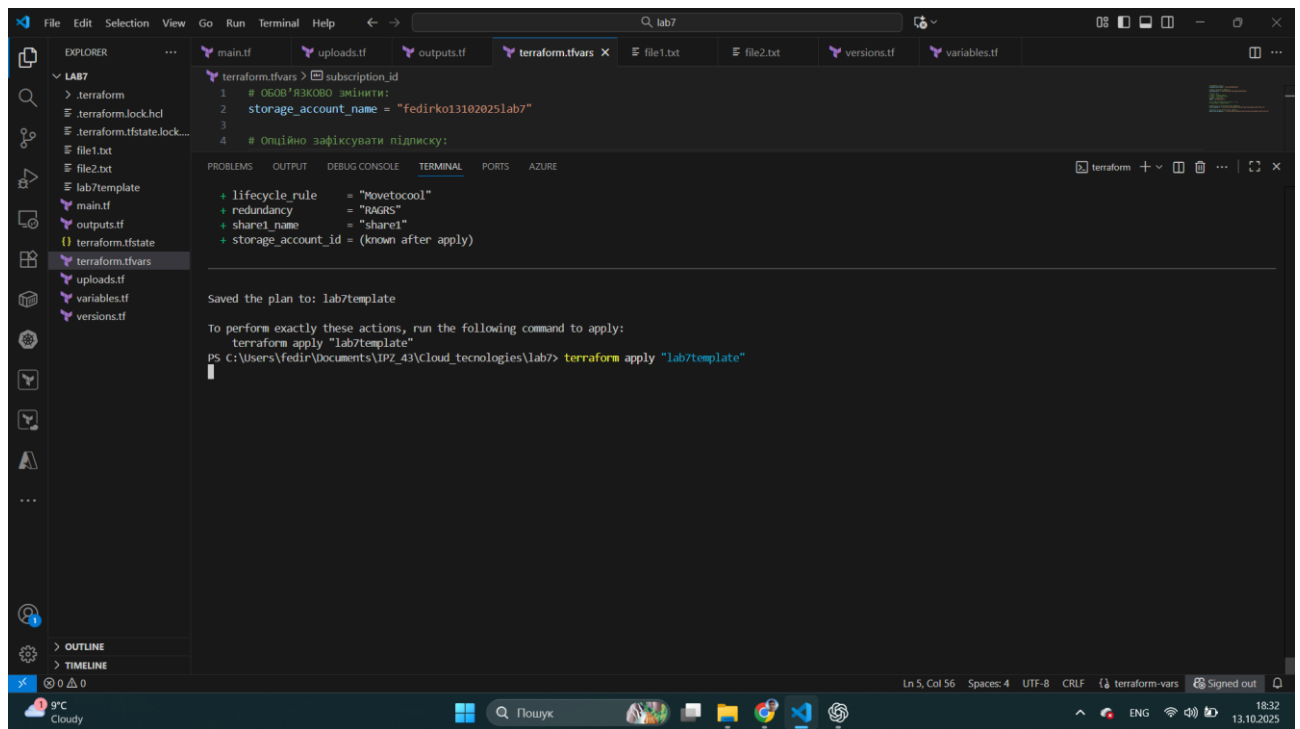
```
For more help on using this command, run:
terraform plan -help
PS C:\Users\fedir\Documents\IPZ_43\Cloud_tecnologies\lab7> terraform plan -out=lab7template

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
+ create
<= read (data resources)

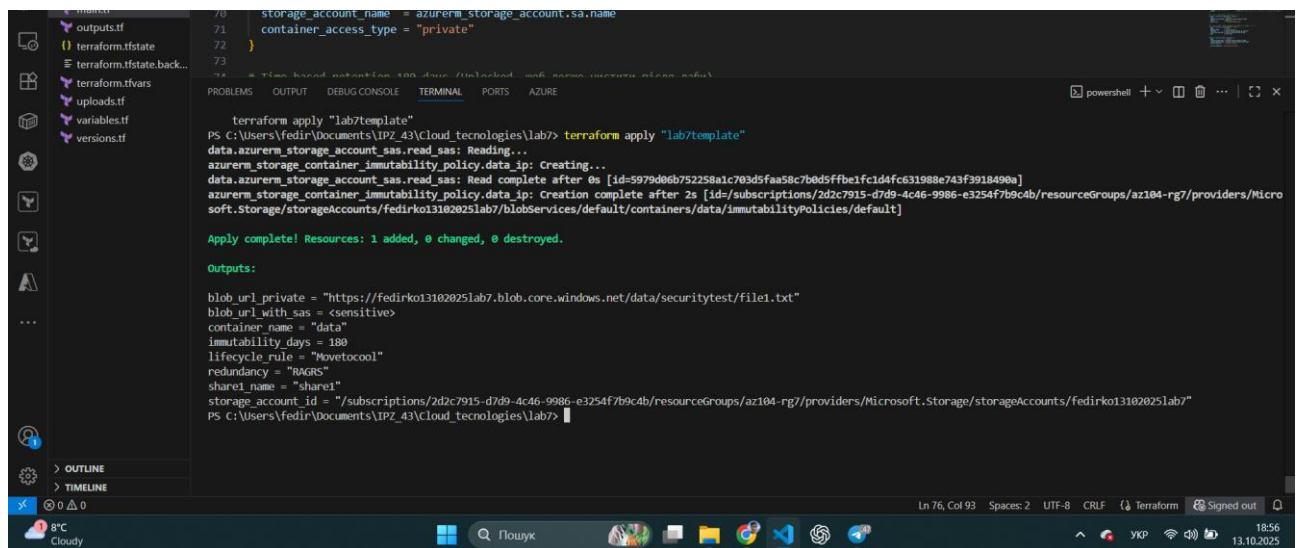
Terraform will perform the following actions:

# data.azure_rm_storage_account_sas.read_sas will be read during apply
# (config refers to values not yet known)
<= data "azure_rm_storage_account_sas" "read_sas" {
  + connection_string = (sensitive value)
  + expiry             = (known after apply)
  + https_only        = true
  + id                = (known after apply)
  + sas               = (sensitive value)
  + signed_version     = "2020-08-04"
  + start              = (known after apply)

  + permissions {
    + add = false
  }
}
```



Деплой теж з першого разу не вийшов



Скріни того що сталося на платформі

Создайте бесплатную учетную запись | az104-rg7 - Microsoft Azure | Lab 07 - Manage Azure Storage

portal.azure.com/#@fedirko816gmail.onmicrosoft.com/resource/subscriptions/2d2c7915-d7d9-4c46-9986-e3254f7b9c4b/resourceGroups/az104-rg7/overview

Microsoft Azure Upgrade Search resources, services, and docs (G+/) Copilot fedirko816@gmail.com

Resource groups

Default Directory (fedirko816gmail.onmicrosoft.co...)

+ Create Manage view ...

az104-rg7 Resource group

Generate Bicep code to duplicate this resource group. How to manage these changes more efficiently with deployment tools? +1

Search

+ Create Manage view Delete resource group Refresh Export to CSV Open query ... Group by none

Overview

- Activity log
- Access control (IAM)
- Tags
- Resource visualizer
- Events
- Settings
 - Deployments
 - Security
 - Deployment stacks
 - Policies
 - Properties
 - Locks
- Cost Management
- Monitoring
- Automation

Showing 1 - 2 of 2. Display count: 20

Add or remove favorites by pressing Ctrl+Shift+F

Essentials JSON View

Resources Recommendations

Filter for any field... Type equals all Location equals all Add filter

Name	Type	Location
fedirko13102025lab7	Storage account	East US
vnet1	Virtual network	East US

Showing 1 - 2 of 2. Display count: 20 Give feedback

8°C Cloudy 18:57 13.10.2025

Storage account

Создайте бесплатную учетную запись | fedirko13102025lab7 - Micros... | Lab 07 - Manage Azure Storage

portal.azure.com/#@fedirko816gmail.onmicrosoft.com/resource/subscriptions/2d2c7915-d7d9-4c46-9986-e3254f7b9c4b/resourceGroups/az104-rg7/providers/Microsoft.Storage/fedirko13102025lab7

Microsoft Azure Upgrade Search resources, services, and docs (G+/) Copilot fedirko816@gmail.com

fedirko13102025lab7

Storage account

Analyze alerts for this storage account How many critical alerts for this storage account How can I make this storage account more secure?

Search

Overview

- Activity log
- Tags
- Diagnose and solve problems
- Access Control (IAM)
- Data migration
- Events
- Storage browser
- Storage Mover
- Partner solutions
- Resource visualizer
- Data storage
- Security + networking
- Data management
- Settings
- Configuration

Location : eastus

Primary/Secondary Loca... : Primary: East US, Secondary: West US

Subscription (move) : Azure subscription 1

Subscription ID : 2d2c7915-d7d9-4c46-9986-e3254f7b9c4b

Disk state : Primary: Available, Secondary: Available

Tags (edit) : lab : az104-lab07 part : storage

Replication : Read-access geo-redundant storage (RA-GRS)

Account kind : StorageV2 (general purpose v2)

Provisioning state : Succeeded

Created : 13.10.2025, 18:33:36

Properties Monitoring Capabilities (7) Recommendations (0) Tutorials Tools + SDKs

Static website

Host static content on the blob service.

Not configured

Data protection

Save and recover data when it is erroneously modified or deleted.

Not configured

Lifecycle management

Create rule-based policies for storage accounts.

Configured

Front Door and CDN Profiles

Serve files faster and more reliably.

Not configured

Custom domain

Configure a custom domain for accessing blob data.

Not configured

Security

Enable Azure Defender for your storage account.

Not configured

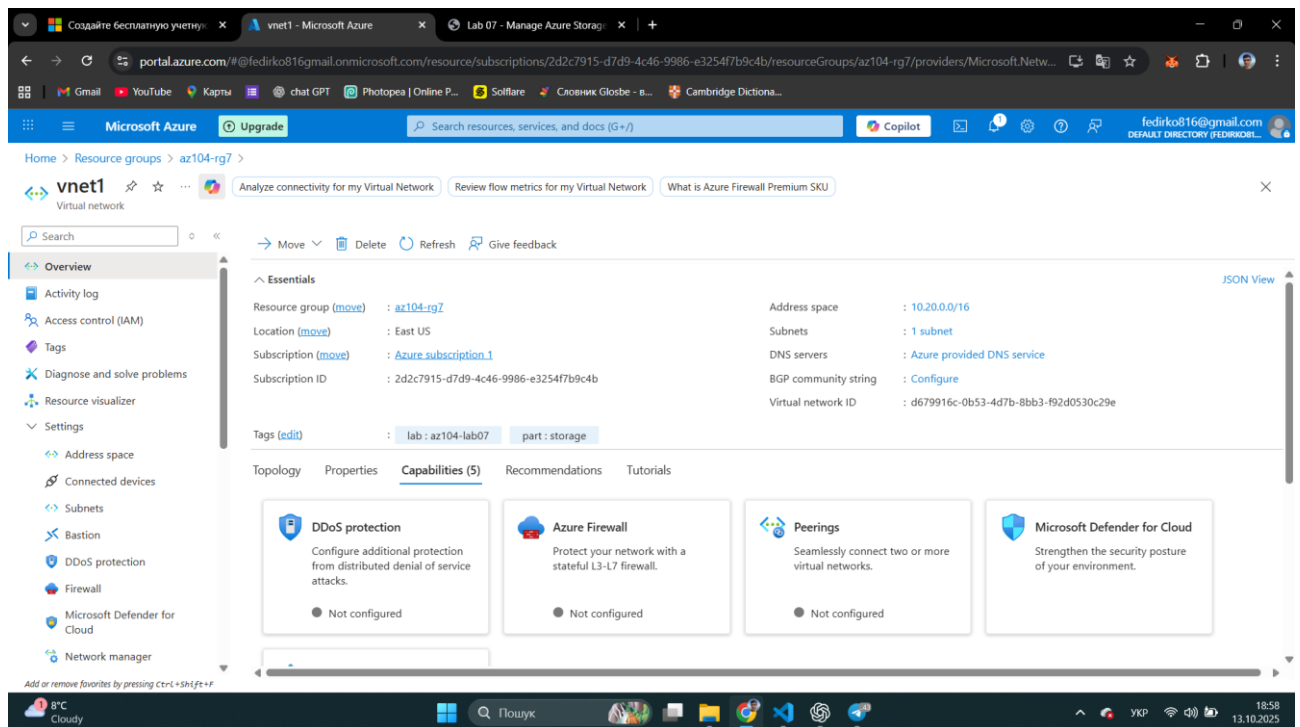
Private endpoints

Secure data access over a private link.

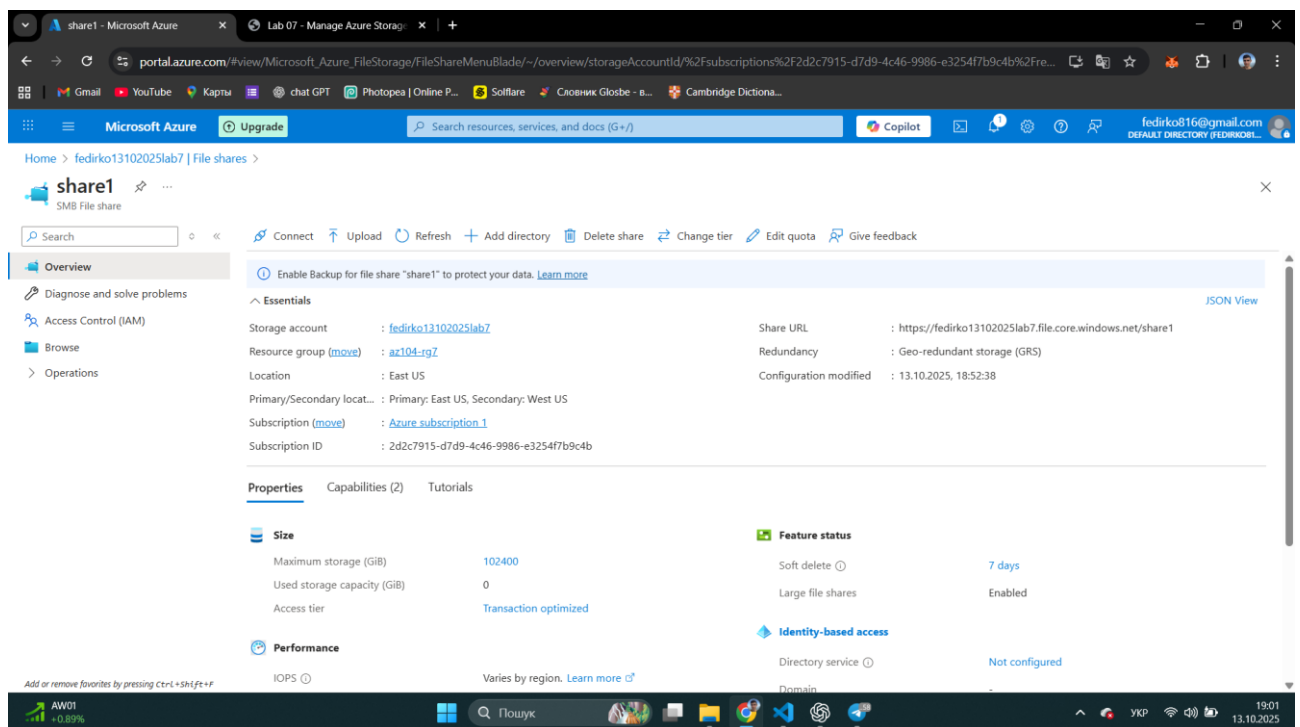
Not configured

8°C Cloudy 18:57 13.10.2025

Віртуальна мережа



Ну і чисто по приколу fileshare



Потім я з доступу по айпі замінив на доступ тільки з віртуальної мережі за допомогою

```

0
7   # Етап мережі:
8   # stage = "disable_public"
9   # stage = "selected_with_ip"
10  # stage = "vnet_only"
11  stage = "vnet_only"
12

```

І ще раз задеплоїв

```

PS C:\Users\Fedir\Documents\IPZ_43\Cloud_tecnologies\lab7> terraform apply "lab7template"
azurerm_storage_account.sa: Modifying... [id=/subscriptions/2d2c7915-d7d9-4c46-9986-e3254f7b9c4b/resourceGroups/az104-rg7/providers/Microsoft.Storage/storageAccounts/fedirkoi3102025lab7]
azurerm_storage_account.sa: Still modifying... [id=/subscriptions/2d2c7915-d7d9-4c46-9986-e3254f7b9c4b/resourceGroups/az104-rg7/providers/Microsoft.Storage/storageAccounts/fedirkoi3102025lab7, 00m10s elapsed]
azurerm_storage_account.sa: Modifications complete after 19s [id=/subscriptions/2d2c7915-d7d9-4c46-9986-e3254f7b9c4b/resourceGroups/az104-rg7/providers/Microsoft.Storage/storageAccounts/fedirkoi3102025lab7]
data.azure_rm_storage_account_sas.read_sas: Reading...
data.azure_rm_storage_account_sas.read_sas: Read complete after 0s [id=aeb2304acf2ade42ebddb5b10008d30e70aceec434cd05d0070d0932bf7d36da]

Apply complete! Resources: 0 added, 1 changed, 0 destroyed.

Outputs:

blob_url_private = "https://fedirkoi3102025lab7.blob.core.windows.net/data/securitytest/file1.txt"
blob_url_with_sas = <sensitive>
container_name = "data"
immutability_days = 180
lifecycle_rule = "MoveToCool"
redundancy = "RAGRS"
share_name = "share1"
storage_account_id = "/subscriptions/2d2c7915-d7d9-4c46-9986-e3254f7b9c4b/resourceGroups/az104-rg7/providers/Microsoft.Storage/storageAccounts/fedirkoi3102025lab7"
PS C:\Users\Fedir\Documents\IPZ_43\Cloud_tecnologies\lab7>

```

А потім все видалив)

Остання (також успішна) спроба задеплойти всі сервіси

```
Plan: 26 to add, 0 to change, 0 to destroy.

Changes to Outputs:
+ appgw_public_ip = (known after apply)
+ lb_public_ip    = (known after apply)

Saved the plan to: lab6template

To perform exactly these actions, run the following command to apply:
    terraform apply "lab6template"
PS C:\Users\Fedir\Documents\TPZ_43\Cloud_tecnologies\lab6> terraform apply "lab6template"
random_password.vm: Creating...
random_password.vm: Creation complete after 0s [id=none]
```

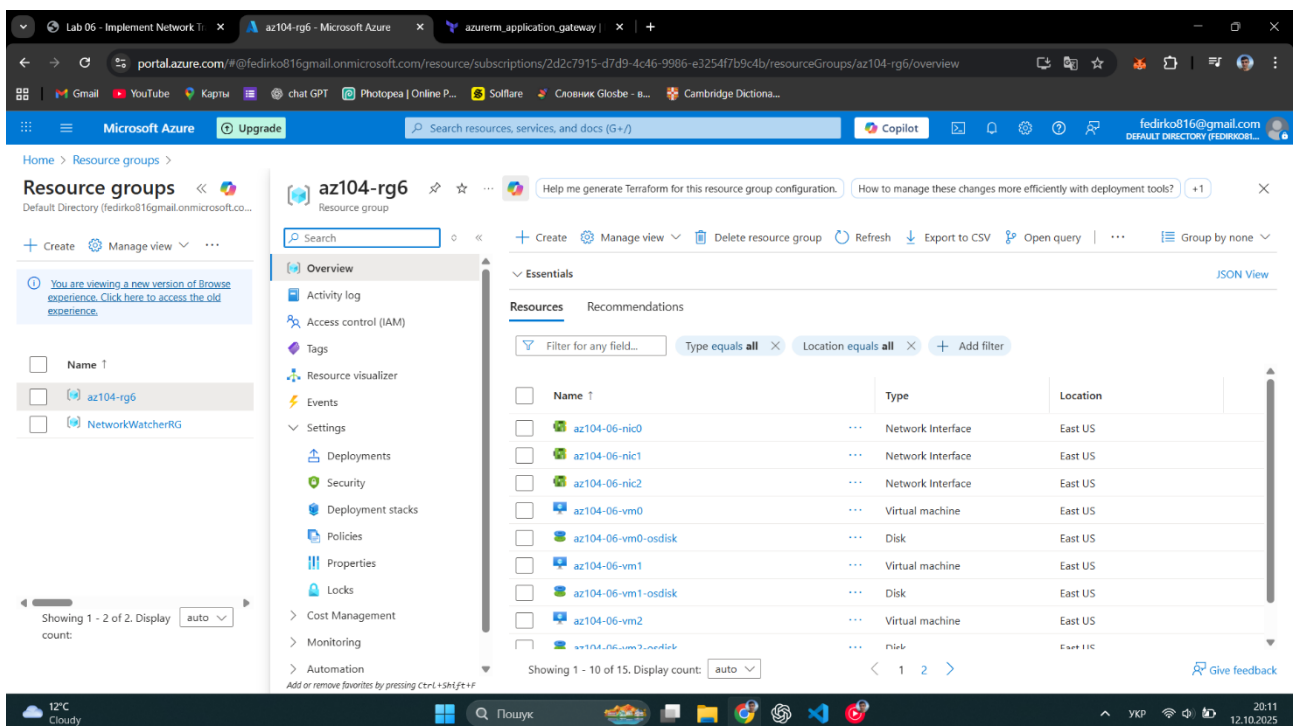
```
412 host = "127.0.0.1"
413 path = "/"

azurerm_application_gateway.appgw: Still creating... [02m20s elapsed]
azurerm_application_gateway.appgw: Still creating... [02m30s elapsed]
azurerm_application_gateway.appgw: Still creating... [02m40s elapsed]
azurerm_application_gateway.appgw: Still creating... [02m50s elapsed]
azurerm_application_gateway.appgw: Still creating... [03m00s elapsed]
azurerm_application_gateway.appgw: Still creating... [03m10s elapsed]
azurerm_application_gateway.appgw: Still creating... [03m20s elapsed]
azurerm_application_gateway.appgw: Still creating... [03m30s elapsed]
azurerm_application_gateway.appgw: Still creating... [03m40s elapsed]
azurerm_application_gateway.appgw: Still creating... [03m50s elapsed]
azurerm_application_gateway.appgw: Still creating... [04m00s elapsed]
azurerm_application_gateway.appgw: Still creating... [04m10s elapsed]
azurerm_application_gateway.appgw: Still creating... [04m20s elapsed]
azurerm_application_gateway.appgw: Still creating... [04m30s elapsed]
azurerm_application_gateway.appgw: Still creating... [04m40s elapsed]
azurerm_application_gateway.appgw: Still creating... [04m50s elapsed]
azurerm_application_gateway.appgw: Creation complete after 4m54s [id=/subscriptions/2d2c7915-d7d9-4c46-9986-e3254f7b9c4b/resourceGroups/az104-rg6/providers/Microsoft.Network/applicationsGateways/az104-appgw]

Apply complete! Resources: 1 added, 0 changed, 0 destroyed.

Outputs:
appgw_public_ip = "74.235.203.159"
lb_public_ip    = "20.169.172.30"
PS C:\Users\Fedir\Documents\TPZ_43\Cloud_tecnologies\lab6>
```

Ну і скрін-докази що все запустилось



Lab 06 - Implement Network T... az104-rg6 - Microsoft Azure azurerm_application_gateway | x +

portal.azure.com/#@fedirko816gma.onmicrosoft.com/resource/subscriptions/2d2c7915-d7d9-4c46-9986-e3254f7b9c4b/resourceGroups/az104-rg6/overview

Microsoft Azure Upgrade Search resources, services, and docs (G+) Copilot fedirko816@gmail.com

Home > az104-rg6 Resource group

Generate Bicep code to duplicate this resource group. How to manage these changes more efficiently with deployment tools? Help me generate Terraform for this resource group configuration.

Search < Create Manage view Delete resource group Refresh Export to CSV Open query Assign tags Move Delete Group by none

Overview Activity log Access control (IAM) Tags Resource visualizer Events Settings Deployments Security Deployment stacks Policies Properties Locks Cost Management Monitoring Automation

Essentials JSON View

Resources Recommendations

Filter for any field... Type equals all Location equals all Add filter

<input type="checkbox"/>	az104-06-vm0-osdisk	Disk	East US
<input type="checkbox"/>	az104-06-vm1	Virtual machine	East US
<input type="checkbox"/>	az104-06-vm1-osdisk	Disk	East US
<input type="checkbox"/>	az104-06-vm2	Virtual machine	East US
<input type="checkbox"/>	az104-06-vm2-osdisk	Disk	East US
<input type="checkbox"/>	az104-06-vnet1	Virtual network	East US
<input type="checkbox"/>	az104-06-web-nsg	Network security group	East US
<input type="checkbox"/>	az104-appgw	Application gateway	East US
<input type="checkbox"/>	az104-gwpip	Public IP address	East US
<input type="checkbox"/>	az104-lb	Load balancer	East US
<input type="checkbox"/>	az104-lbpip	Public IP address	East US

Showing 1 - 15 of 15. Display count: 20 Give feedback

12°C Cloudy 20:16 12.10.2025

Ну і видалення)

PS C:\Users\fedir\Documents\IPZ_43\Cloud technologies\lab6> terraform destroy -auto-approve

random_password.vm: Refreshing state... [id=none]

Ln 422, Col 4 Spaces: 4 UTF-8 CRLF Terraform Signed out

12°C Cloudy 20:17 12.10.2025

File Edit Selection View Go Run Terminal Help lab6

EXPLORER LAB6 .terraform terraform.lock.hcl lab6template main.tf terraform.tfstate terraform.tfstate.backup terraform.tfvars

main.tf

```
resource "azurerm_application_gateway" "appgw" {
  backend_address_pool {
    ip_addresses = [azurerm_network_interface.nic2.private_ip_address]
  }
  probe {
    name           = "http-probe-80"
    protocol       = "Http"
    host           = "127.0.0.1"
    path           = "/"
  }
}
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS AZURE

subnets/subnet-web3] azurerm_network_interface.nic0: Still destroying... [id=/subscriptions/2d2c7915-d7d9-4c46-9986-...etwork/networkInterfaces/az104-06-nic0, 00m10s elapsed]

azurerm_subnet.sn_web2: Still destroying... [id=/subscriptions/2d2c7915-d7d9-4c46-9986-...rks/az104-06-vnet1/subnets/subnet-web2, 00m20s elapsed]

azurerm_subnet.sn_web3: Still destroying... [id=/subscriptions/2d2c7915-d7d9-4c46-9986-...rks/az104-06-vnet1/subnets/subnet-web3, 00m10s elapsed]

azurerm_subnet.sn_web2: Destruction complete after 22s

azurerm_network_interface.nic0: Still destroying... [id=/subscriptions/2d2c7915-d7d9-4c46-9986-...etwork/networkInterfaces/az104-06-nic0, 00m20s elapsed]

azurerm_network_interface.nic0: Still destroying... [id=/subscriptions/2d2c7915-d7d9-4c46-9986-...etwork/networkInterfaces/az104-06-nic0, 00m20s elapsed]

azurerm_network_interface.nic0: Still destroying... [id=/subscriptions/2d2c7915-d7d9-4c46-9986-...etwork/networkInterfaces/az104-06-nic0, 00m30s elapsed]

azurerm_network_interface.nic0: Destruction complete after 31s

azurerm_subnet.sn_web1: Destroying... [id=/subscriptions/2d2c7915-d7d9-4c46-9986-e3254f7b9c4b/resourceGroups/az104-rg6/providers/Microsoft.Network/virtualNetworks/az104-06-vnet1/subnets/subnet-web1]

azurerm_subnet.sn_web3: Still destroying... [id=/subscriptions/2d2c7915-d7d9-4c46-9986-...rks/az104-06-vnet1/subnets/subnet-web3, 00m30s elapsed]

azurerm_subnet.sn_web1: Still destroying... [id=/subscriptions/2d2c7915-d7d9-4c46-9986-...rks/az104-06-vnet1/subnets/subnet-web1, 00m10s elapsed]

azurerm_subnet.sn_web1: Destruction complete after 33s

azurerm_subnet.sn_web1: Still destroying... [id=/subscriptions/2d2c7915-d7d9-4c46-9986-...rks/az104-06-vnet1/subnets/subnet-web1, 00m20s elapsed]

azurerm_subnet.sn_web1: Destruction complete after 22s

azurerm_virtual_network.vnet: Destroying... [id=/subscriptions/2d2c7915-d7d9-4c46-9986-e3254f7b9c4b/resourceGroups/az104-rg6/providers/Microsoft.Network/virtualNetworks/az104-06-vnet1]

azurerm_virtual_network.vnet: Destruction complete after 11s

azurerm_resource_group.rg: Destroying... [id=/subscriptions/2d2c7915-d7d9-4c46-9986-e3254f7b9c4b/resourceGroups/az104-rg6]

azurerm_resource_group.rg: Still destroying... [id=/subscriptions/2d2c7915-d7d9-4c46-9986-e3254f7b9c4b/resourceGroups/az104-rg6, 00m10s elapsed]

azurerm_resource_group.rg: Destruction complete after 18s

Destroy complete! Resources: 26 destroyed.

PS C:\Users\fedir\Documents\IPZ_43\Cloud technologies\lab6>

Ln 422, Col 4 Spaces: 4 UTF-8 CRLF Terraform Signed out

12°C Cloudy 20:23 12.10.2025