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Кафедра інформаційних технологій

Інформатика і програмування

Лабораторна робота № 4

Тема: Реалізувати віртуальну мережу

Виконав: Федірко А.Р

Група ІІЗ-43

Дата: 11 жовтня 2025р.

Викладач: Поварчук Д.Д

Лабораторний сценарій

Ваша глобальна організація планує впроваджувати віртуальні мережі.

Найближча мета - вмістити всі наявні ресурси. Однак організація перебуває на етапі зростання і хоче забезпечити наявність додаткових можливостей для зростання.

Найбільшу кількість ресурсів має віртуальна мережа CoreServicesVnet.

Очікується велике зростання, тому для цієї віртуальної мережі необхідний великий адресний простір.

Віртуальна мережа ManufacturingVnet містить системи для роботи виробничих потужностей. Організація передбачає велику кількість внутрішніх підключених пристроїв для отримання даних із їхніх систем

Завдання 1: Створення шаблону Azure Resource Manager.

Завдання 1 Створити віртуальну мережу з підмережами за допомогою порталу

Створюємо віртуальну мережу

The screenshot shows the 'Create virtual network' page in the Azure portal, specifically the 'IP addresses' tab. The page is for a virtual network named 'Microsoft.VirtualNetwork'. The 'IP addresses' tab is active, showing a list of subnets. The main address space is 10.20.0.0/16, which is divided into two subnets: 'SharedServicesSubnet' and 'DatabaseSubnet'. Both subnets have an IP address range of 10.20.10.0 - 10.20.10.255 and a size of /24 (256 addresses). The 'NAT gateway' column shows '-' for both subnets. The page includes navigation tabs for 'Basics', 'Security', 'IP addresses', 'Tags', and 'Review + create'. At the bottom, there are buttons for 'Previous', 'Next', and 'Review + create'. The Windows taskbar at the bottom shows the date as 11.10.2025 and the time as 12:18.

Subnets	IP address range	Size	NAT gateway
SharedServicesSubnet	10.20.10.0 - 10.20.10.255	/24 (256 addresses)	-
DatabaseSubnet	10.20.20.0 - 10.20.20.255	/24 (256 addresses)	-

Create virtual network - Micros

portal.azure.com/#create/Microsoft.VirtualNetwork

GmailYouTubeКартыchat GPTPhotopea | Online P...SolflareСловник Glosbe - в...Cambridge Dictiona...

Microsoft AzureUpgradeSearch resources, services, and docs (G+ /)Copilot

Home > Network foundation | Virtual networks >

Create virtual network

Validation passed

BasicsSecurityIP addressesTagsReview + create

View automation template

Basics

Subscription	Azure subscription 1
Resource Group	az104-rg4
Name	CoreServicesVnet
Region	East US

Security

Azure Bastion	Disabled
Azure Firewall	Disabled
Azure DDoS Network Protection	Disabled

IP addresses

PreviousNextCreateDownload a template for automationGive feedback

12°C Mostly cloudyПошук12:18 11.10.2025

Create virtual network - Micros

portal.azure.com/#create/Microsoft.VirtualNetwork

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Microsoft AzureUpgradeSearch resources, services, and docs (G+ /)Copilot

Home > Network foundation | Virtual networks >

Create virtual network

Validation passed

BasicsSecurityIP addressesTagsReview + create

NameCoreServicesVnetRegionEast US

Security

Azure Bastion	Disabled
Azure Firewall	Disabled
Azure DDoS Network Protection	Disabled

IP addresses

Address space	10.20.0.0/16 (65 536 addresses)
Subnet	SharedServicesSubnet (10.20.10.0/24) (256 addresses)
Subnet	DatabaseSubnet (10.20.20.0/24) (256 addresses)

Tags

PreviousNextCreateDownload a template for automation

12°C Mostly cloudyПошук12:18 11.10.2025

Засіб заповнення фрагментів

Знімок екрана скопійовано до буфера обміну. Автоматичне збереження в папці знімків екрана.

Виправлення та надання спільного доступу

Результат, мрежа створилась

The screenshot displays the Microsoft Azure portal interface. At the top, the browser address bar shows the URL: `portal.azure.com/#view/HubsExtension/DeploymentDetailsBlade/~/overview/id/%2Fsubscriptions%2F2d2c7915-d7d9-4c46-9986-e3254f7b9c4b%2FresourceGroups%2Fa...`. The page title is "CoreServicesVnet-1760174328384 | Overview".

On the left sidebar, the "Overview" tab is selected, with sub-items for "Inputs", "Outputs", and "Template".

The main content area features a green checkmark icon and the text "Your deployment is complete". Below this, the deployment details are listed:

- Deployment name: CoreServicesVnet-1760174328384
- Subscription: Azure subscription 1
- Resource group: az104-rg4

Additional information includes the start time (10/11/2025, 12:18:55 PM) and correlation ID (b8e8cd46-2280-4ec4-9865-5b36f9fb19a).

Below the deployment details, there are sections for "Deployment details", "Next steps", and a "Go to resource" button. A "Give feedback" link is also present.

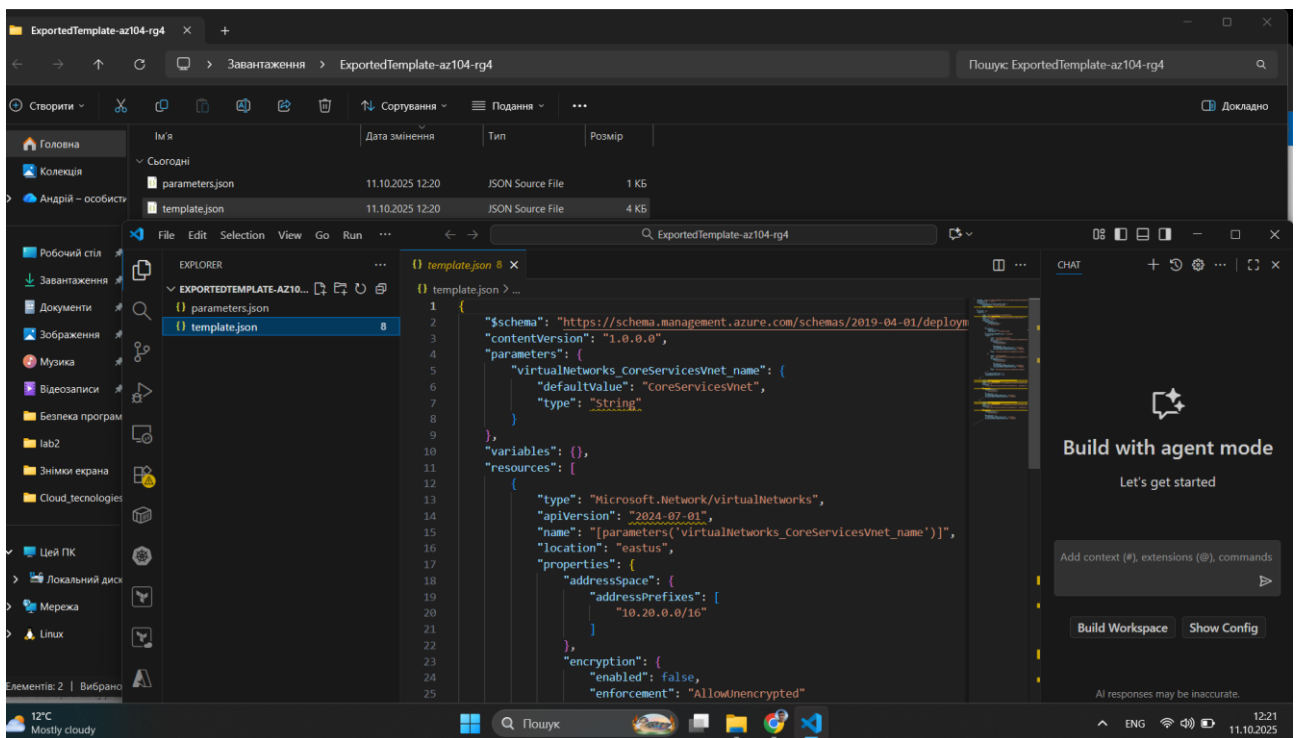
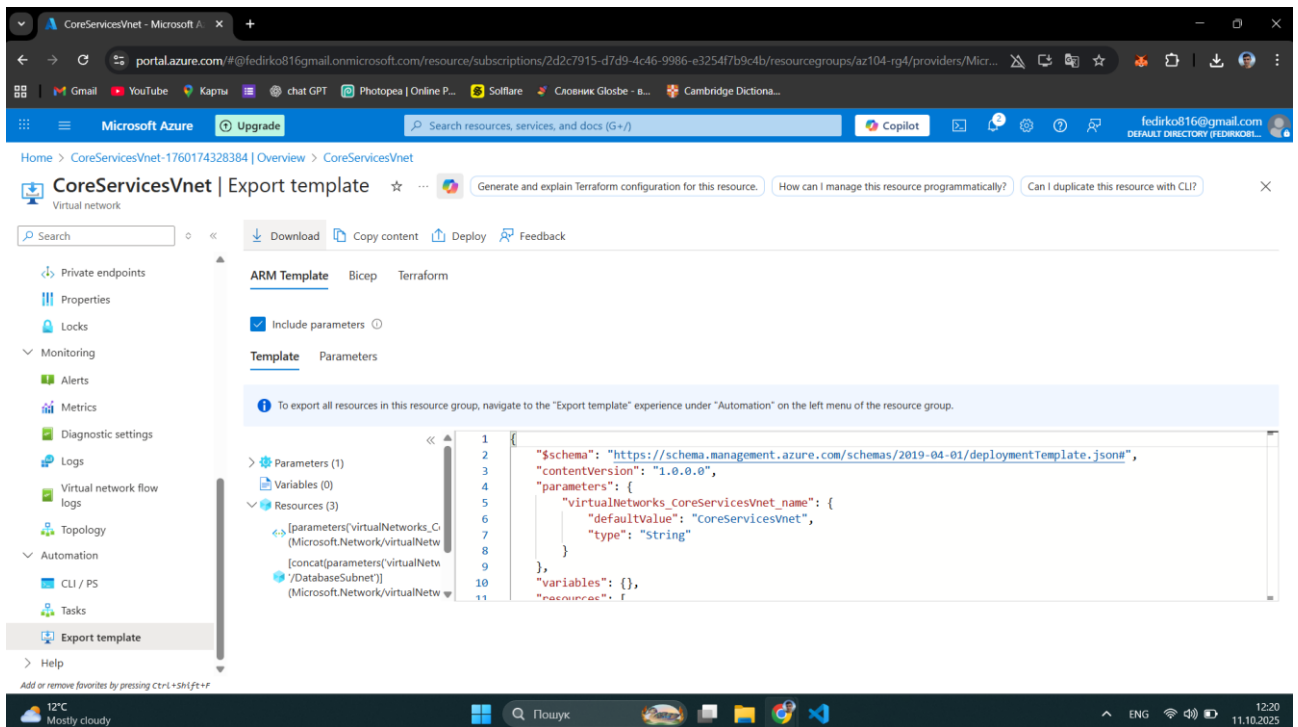
On the right sidebar, there are several recommendations:

- Cost management**: Get notified to stay within your budget and prevent unexpected charges on your bill. [Set up cost alerts >](#)
- Microsoft Defender for Cloud**: Secure your apps and infrastructure. [Go to Microsoft Defender for Cloud >](#)
- Free Microsoft tutorials**: Start learning today >
- Work with an expert**: Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support. [Find an Azure expert >](#)

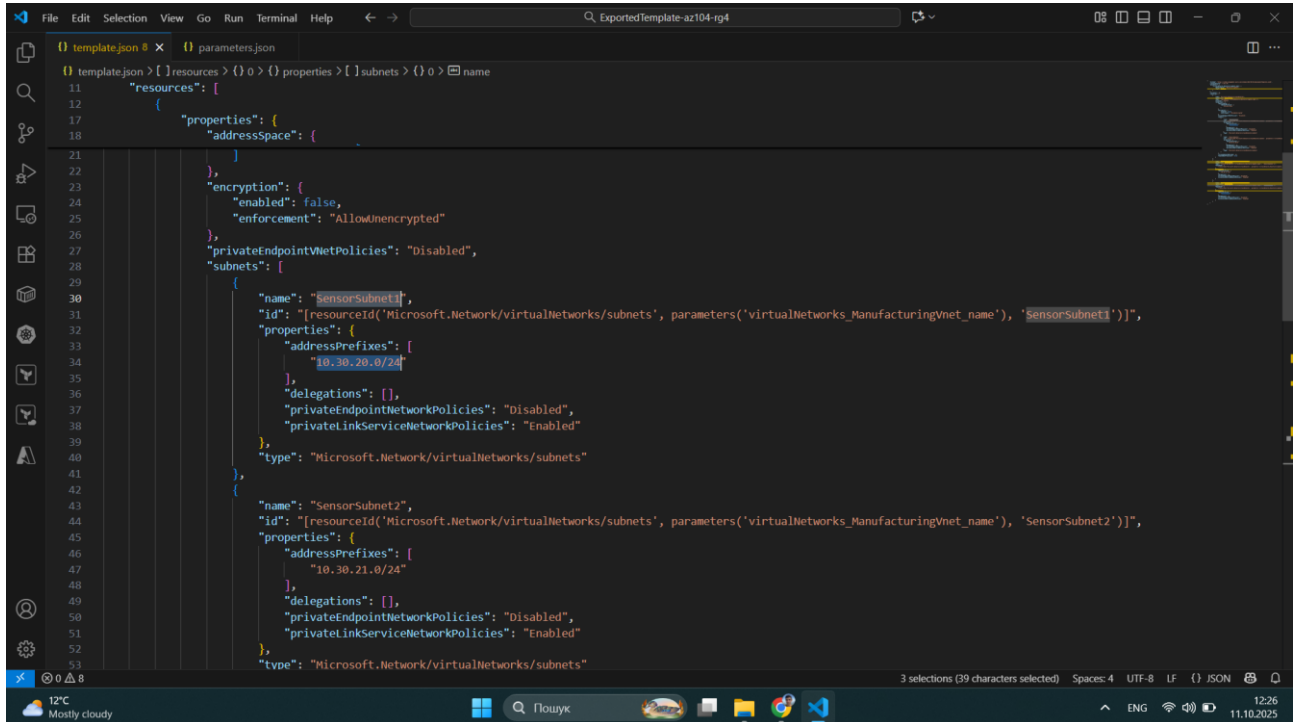
The bottom of the screen shows the Windows taskbar with the date and time (12:19, 11.10.2025) and the system tray.

Завдання 2 Створить віртуальну мережу та підмережі за допомогою шаблону

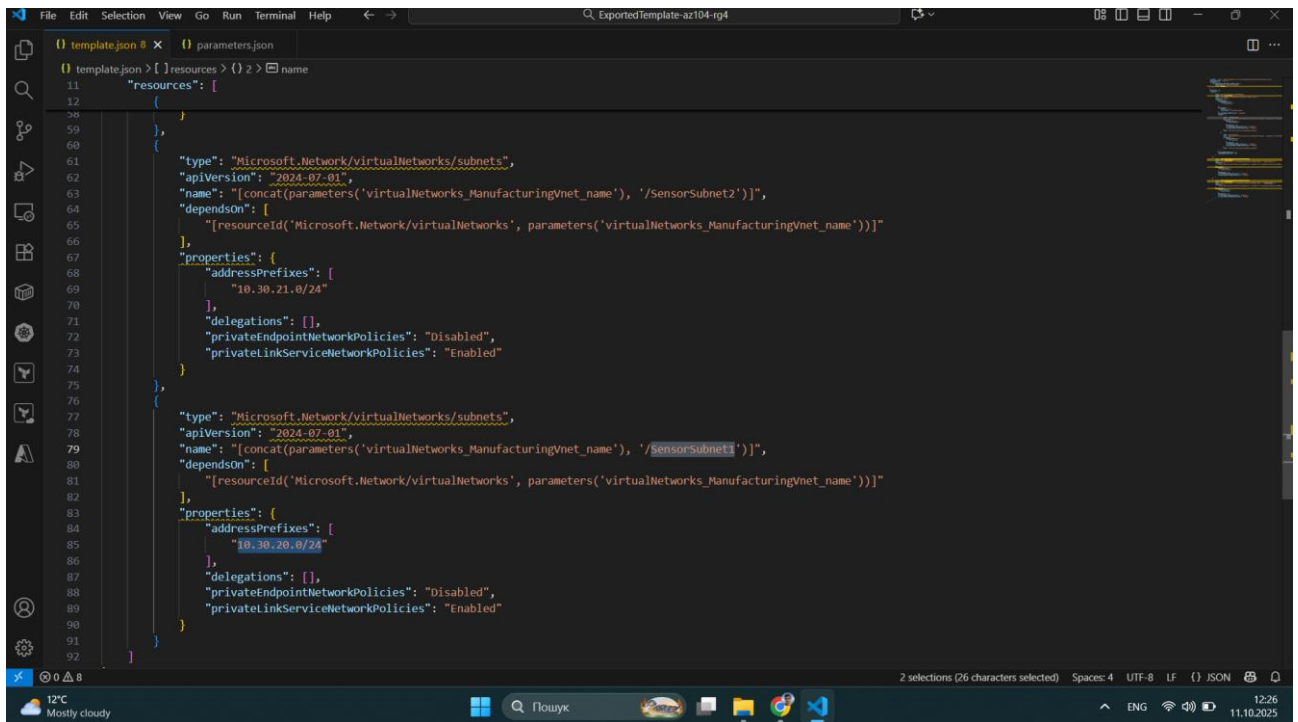
Качаємо шаблон та редагуємо у вскоді



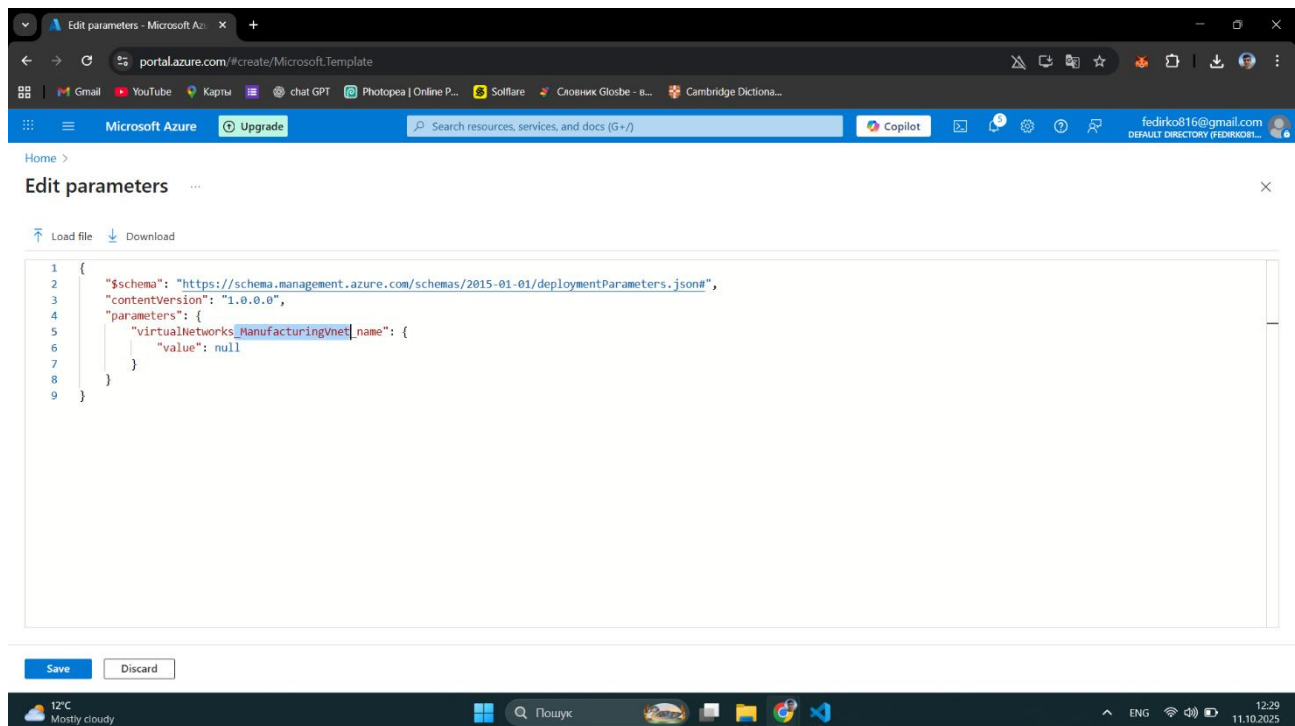
Тут показано що я все відредагував (за кадром залишилась початкова адреса)



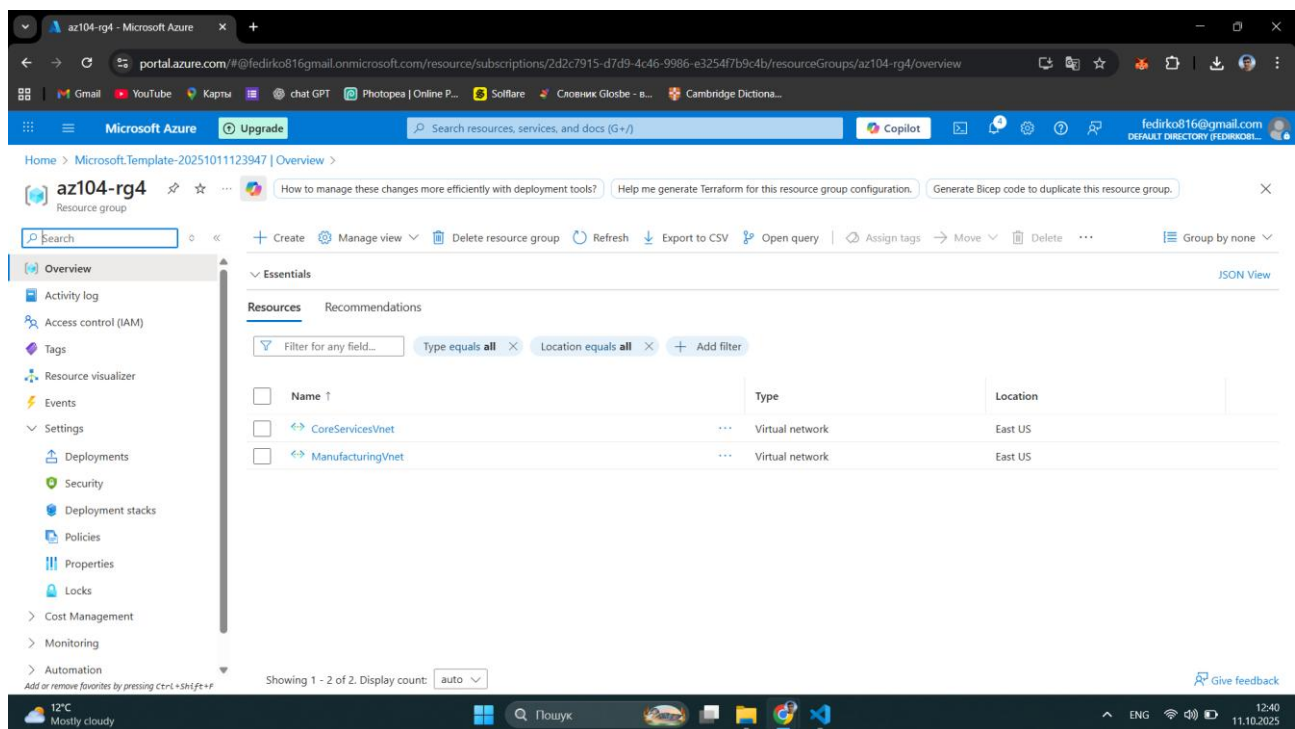
```
template.json > {} resources > {} 0 > {} properties > {} subnets > {} 0 > name
11 "resources": [
12 {
13   "type": "Microsoft.Network/virtualNetworks",
14   "name": "ManufacturingVnet",
15   "location": "West Europe",
16   "properties": {
17     "addressSpace": {
18       "addressPrefixes": [
19         "10.30.0.0/24"
20       ]
21     },
22     "encryption": {
23       "enabled": false,
24       "enforcement": "AllowUnencrypted"
25     },
26     "privateEndpointNetworkPolicies": "Disabled",
27     "subnets": [
28       {
29         "name": "SensorSubnet1",
30         "id": "[resourceId('Microsoft.Network/virtualNetworks/subnets', parameters('virtualNetworks_ManufacturingVnet_name'), 'SensorSubnet1')]",
31         "properties": {
32           "addressPrefixes": [
33             "10.30.20.0/24"
34           ],
35           "delegations": [],
36           "privateEndpointNetworkPolicies": "Disabled",
37           "privateLinkServiceNetworkPolicies": "Enabled"
38         },
39         "type": "Microsoft.Network/virtualNetworks/subnets"
40       },
41       {
42         "name": "SensorSubnet2",
43         "id": "[resourceId('Microsoft.Network/virtualNetworks/subnets', parameters('virtualNetworks_ManufacturingVnet_name'), 'SensorSubnet2')]",
44         "properties": {
45           "addressPrefixes": [
46             "10.30.21.0/24"
47           ],
48           "delegations": [],
49           "privateEndpointNetworkPolicies": "Disabled",
50           "privateLinkServiceNetworkPolicies": "Enabled"
51         },
52         "type": "Microsoft.Network/virtualNetworks/subnets"
53       }
54     ]
55   }
56 },
57 {
58   "type": "Microsoft.Network/virtualNetworkGateways",
59   "name": "ManufacturingVnetGateway",
60   "location": "West Europe",
61   "properties": {
62     "type": "Vpn",
63     "sku": "VpnG1",
64     "vpnType": "Vpn",
65     "ipAddresses": [
66       "10.30.0.0/24"
67     ]
68   }
69 },
70 {
71   "type": "Microsoft.Network/virtualNetworkGateways",
72   "name": "ManufacturingVnetGateway",
73   "location": "West Europe",
74   "properties": {
75     "type": "Vpn",
76     "sku": "VpnG1",
77     "vpnType": "Vpn",
78     "ipAddresses": [
79       "10.30.0.0/24"
80     ]
81   }
82 }
83 ]
84 }
```



```
template.json > {} resources > {} 2 > name
11 "resources": [
12 {
13   "type": "Microsoft.Network/virtualNetworks",
14   "name": "ManufacturingVnet",
15   "location": "West Europe",
16   "properties": {
17     "addressSpace": {
18       "addressPrefixes": [
19         "10.30.0.0/24"
20       ]
21     },
22     "encryption": {
23       "enabled": false,
24       "enforcement": "AllowUnencrypted"
25     },
26     "privateEndpointNetworkPolicies": "Disabled",
27     "subnets": [
28       {
29         "name": "SensorSubnet1",
30         "id": "[resourceId('Microsoft.Network/virtualNetworks/subnets', parameters('virtualNetworks_ManufacturingVnet_name'), 'SensorSubnet1')]",
31         "properties": {
32           "addressPrefixes": [
33             "10.30.20.0/24"
34           ],
35           "delegations": [],
36           "privateEndpointNetworkPolicies": "Disabled",
37           "privateLinkServiceNetworkPolicies": "Enabled"
38         },
39         "type": "Microsoft.Network/virtualNetworks/subnets"
40       },
41       {
42         "name": "SensorSubnet2",
43         "id": "[resourceId('Microsoft.Network/virtualNetworks/subnets', parameters('virtualNetworks_ManufacturingVnet_name'), 'SensorSubnet2')]",
44         "properties": {
45           "addressPrefixes": [
46             "10.30.21.0/24"
47           ],
48           "delegations": [],
49           "privateEndpointNetworkPolicies": "Disabled",
50           "privateLinkServiceNetworkPolicies": "Enabled"
51         },
52         "type": "Microsoft.Network/virtualNetworks/subnets"
53       }
54     ]
55   }
56 },
57 {
58   "type": "Microsoft.Network/virtualNetworkGateways",
59   "name": "ManufacturingVnetGateway",
60   "location": "West Europe",
61   "properties": {
62     "type": "Vpn",
63     "sku": "VpnG1",
64     "vpnType": "Vpn",
65     "ipAddresses": [
66       "10.30.0.0/24"
67     ]
68   }
69 },
70 {
71   "type": "Microsoft.Network/virtualNetworkGateways",
72   "name": "ManufacturingVnetGateway",
73   "location": "West Europe",
74   "properties": {
75     "type": "Vpn",
76     "sku": "VpnG1",
77     "vpnType": "Vpn",
78     "ipAddresses": [
79       "10.30.0.0/24"
80     ]
81   }
82 }
83 ]
84 }
```

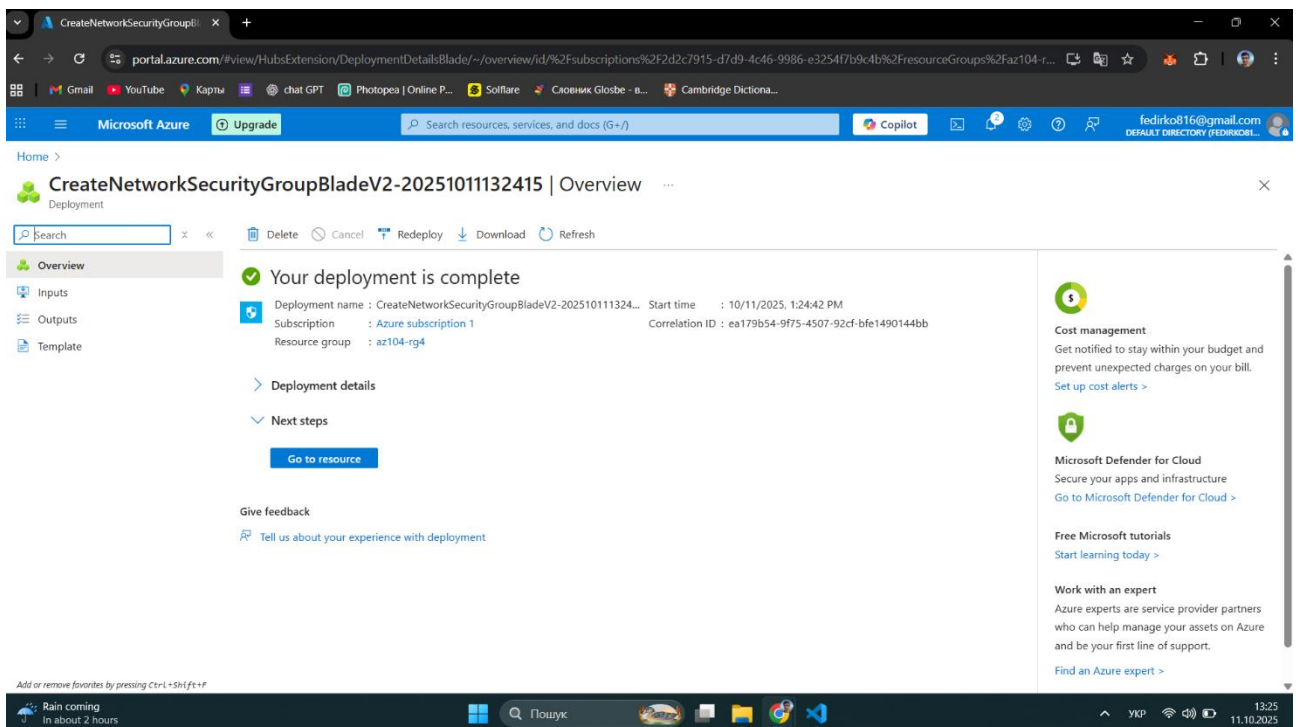
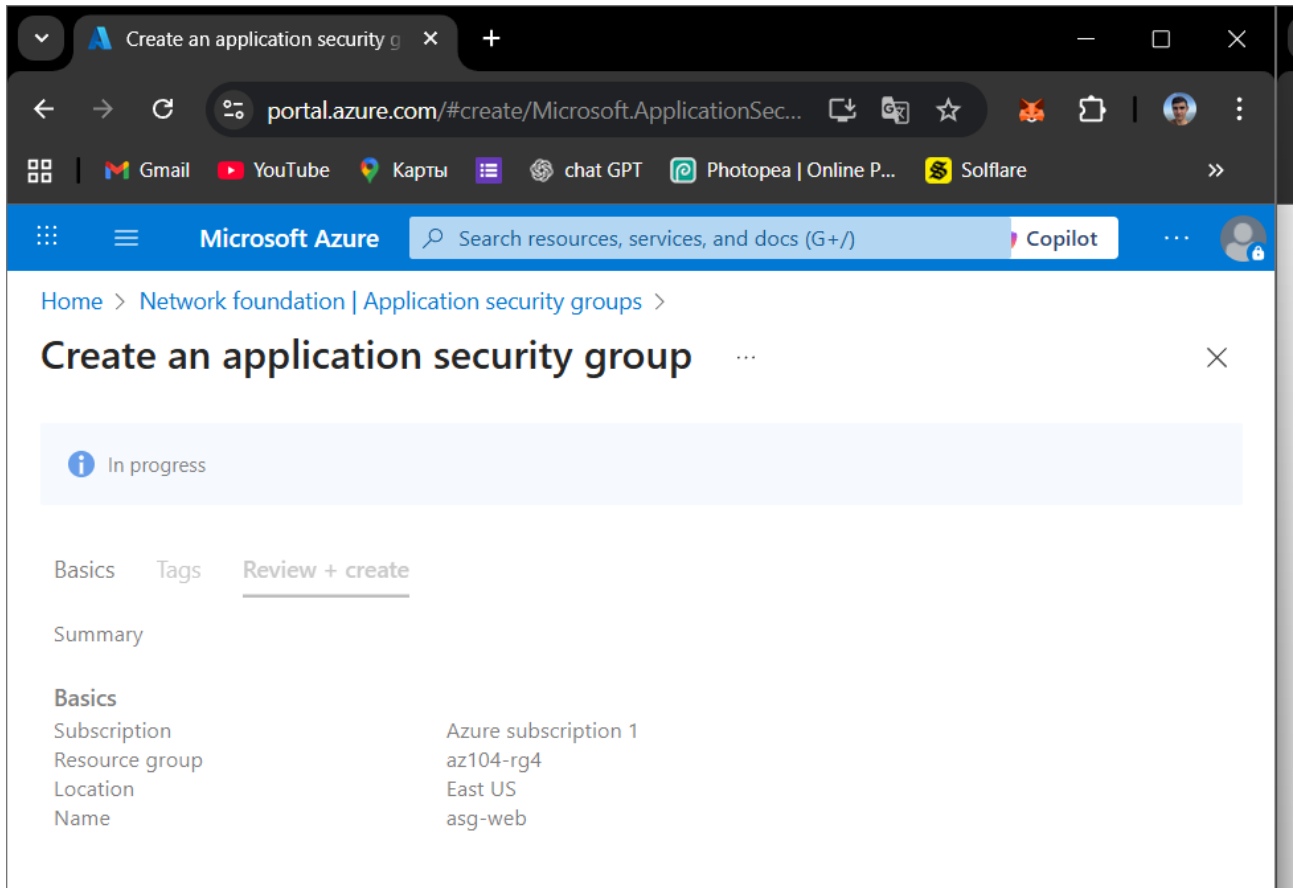



Результат: дві віртуальні мережі

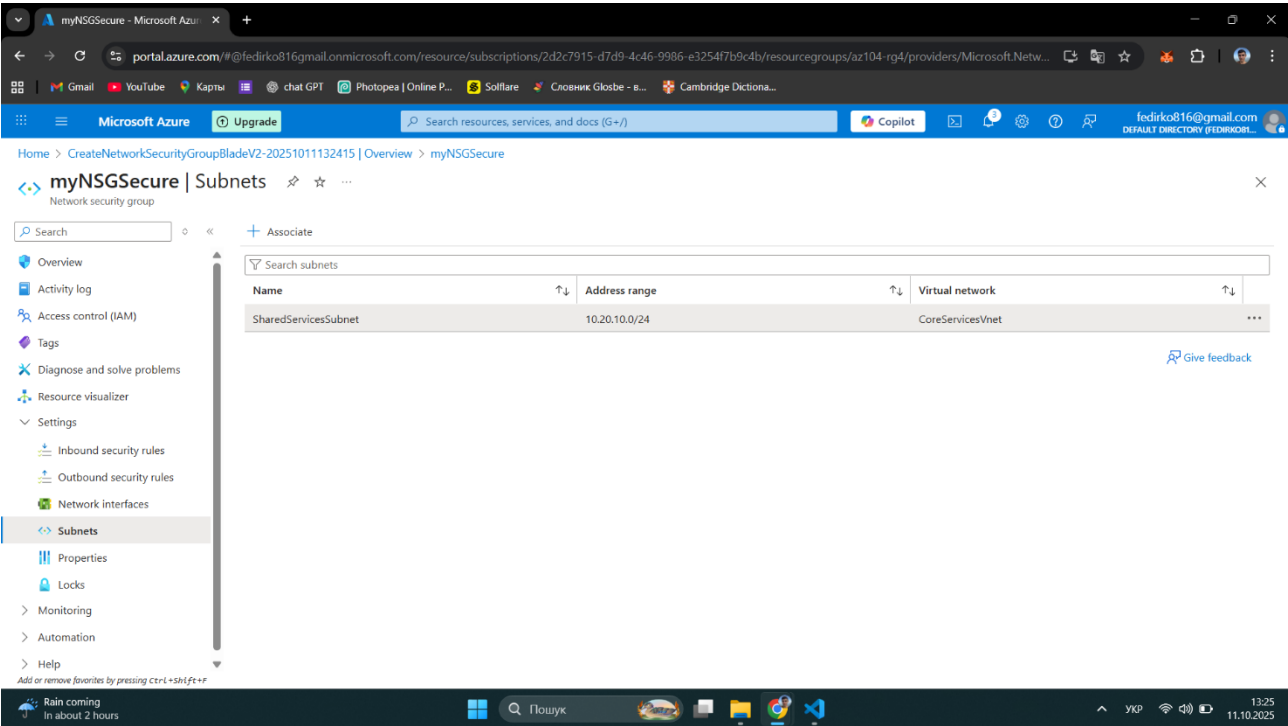


Завдання 3 Створіть і налаштуйте зв'язок між групою безпеки програми та групою безпеки мережі

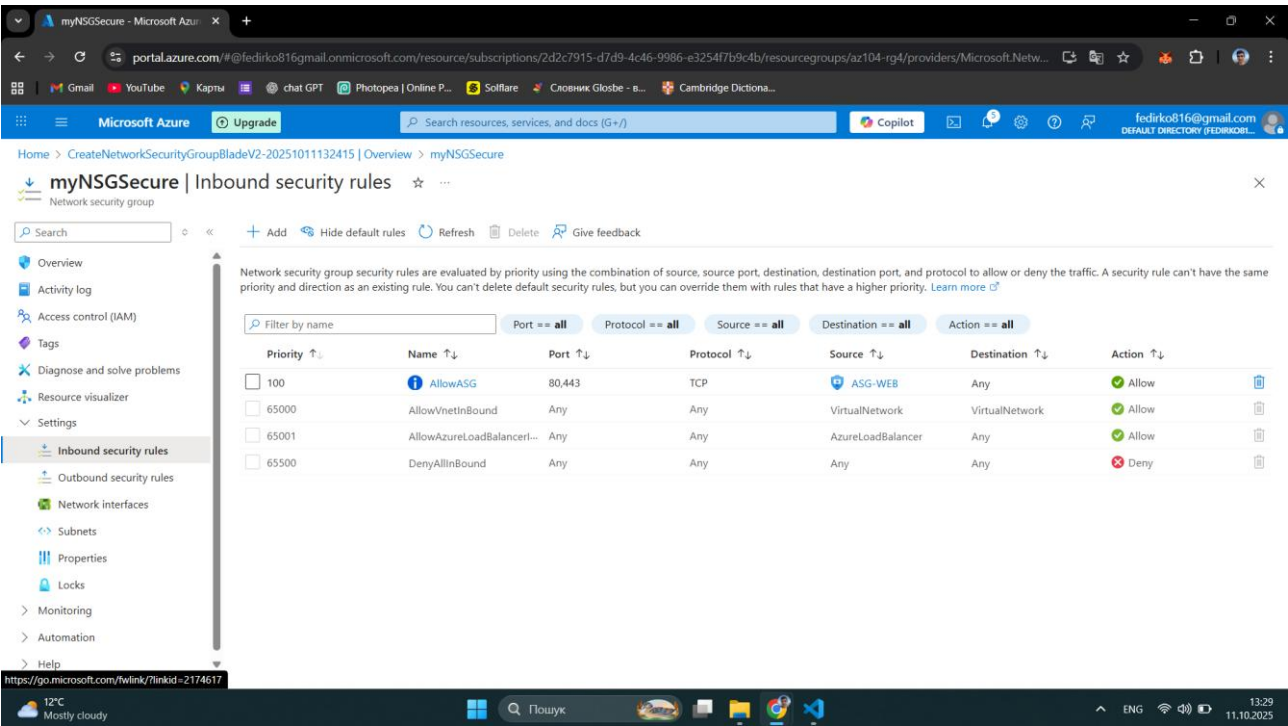
Групу безпеки



За кадром додав підмережу



Прокинув вхідні та вихідні правила безпеки



myNSGSecure - Microsoft Azure

portal.azure.com/#@fedirko816gmail.onmicrosoft.com/resource/subscriptions/2d2c7915-d7d9-4c46-9986-e3254f7b9c4b/resourcegroups/az104-rg4/providers/Microsoft.Network...

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Microsoft AzureUpgradeSearch resources, services, and docs (G+)

Copilot

fedirko816@gmail.comDEFAULT DIRECTORY (FEDIRKO816...)

Home > CreateNetworkSecurityGroupBladeV2-20251011132415 | Overview > myNSGSecure

myNSGSecure | Outbound security rules

Network security group

Search

+ AddHide default rulesRefreshDeleteGive feedback

OverviewActivity logAccess control (IAM)TagsDiagnose and solve problemsResource visualizerSettingsInbound security rulesOutbound security rulesNetwork interfacesSubnetsPropertiesLocksMonitoringAutomation

Network security group security rules are evaluated by priority using the combination of source, source port, destination, destination port, and protocol to allow or deny the traffic. A security rule can't have the same priority and direction as an existing rule. You can't delete default security rules, but you can override them with rules that have a higher priority. [Learn more](#)

Filter by name

Port == allProtocol == allSource == allDestination == allAction == all

Priority	Name	Port	Protocol	Source	Destination	Action
4096	DenyInternetOutbound	Any	Any	Any	Internet	Deny
65000	AllowVnetOutbound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowInternetOutbound	Any	Any	Any	Internet	Allow
65500	DenyAllOutbound	Any	Any	Any	Any	Deny

Засіб захоплення фрагментів

Знімок екрана скопійовано до буфера обміну. Автоматичне збереження в папці знімків екрана.

Виправлення та надання спільного доступу

https://go.microsoft.com/fwlink/?linkid=2174617

12°C Mostly cloudy

Пошук

ENG

13:29 11.10.2025

Завдання 4, Налаштуйте публічні та приватні зони Azure DNS

Створюємо DNS зону

Microsoft Azure portal interface showing the 'Create a DNS Zone' wizard. The wizard is at the 'Review + Create' step, displaying details for the 'contosoFedirkoA.com' DNS zone.

Basics

Subscription	Azure subscription 1
Resource group	az104-rg4
Resource group location	East US
Name	contosoFedirkoA.com

DNS Zone Record Set(s)

Number of record sets	0 record set(s)
-----------------------	-----------------

Below the wizard, the 'contosoFedirkoA.com' DNS zone overview is visible, showing Essentials, Get Started, and various management options.

contosoFedirkoA.com DNS zone

Overview

- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems
- Resource visualizer
- Settings
- DNS Management
- Monitoring
- Automation
- Help

Essentials

Resource group (move)	: az104-rg4
Location	: Global
Subscription (move)	: Azure subscription 1
Subscription ID	: 2d2c7915-d7d9-4c46-9986-e3254f7b9c4b
Recordsets	: 2
Tags (edit)	: Add tags

Get Started | Tutorials | Tools + SDK

Azure DNS is a hosting service for DNS domains that provides name resolution by using Microsoft Azure infrastructure. By hosting your domains in Azure, you can manage your DNS records by using the same credentials, APIs, tools, and billing as your other Azure services.

Add DNS record sets

Begin hosting your domain in Azure DNS by adding record sets. A record set is a collection of records in a zone that have the same name and are the same.

Import record sets from file

You have the option to import your zone directly using the import utility. This utility offers a rapid, dependable, and convenient method for transferring DNS.

Access control

View your level of access to DNS zone. Review the level of access a user, group, service principal, or managed identity has to this DNS zone.

Azure DNS Documentation

For detail understanding of Azure DNS, refer to the documentation.

Додаємо запис до DNS зони

The screenshot shows the Microsoft Azure portal interface. The left sidebar contains navigation links: Home, contosoFedirkoA, contosoFedirkoA DNS zone, Search, Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Resource visualizer, Settings, DNS Management, Recordsets, DNSSEC, Monitoring, Automation, and Help. The main content area is titled 'Add record set' for the 'contosoFedirkoA.com' zone. The form includes the following fields: Name (www), Type (A - IPv4 Address records), Alias record set (No), TTL (1), TTL unit (Hours), and IP address (10.1.1.4 and 0.0.0.0). At the bottom, there are 'Add', 'Cancel', and 'Give feedback' buttons.

portal.azure.com/#@fedirko816gmail.onmicrosoft...

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Copilot

Home > contosoFedirkoA

contosoFedirkoA DNS zone

Search

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Resource visualizer

Settings

DNS Management

Recordsets

DNSSEC

Monitoring

Automation

Help

Add record set

contosoFedirkoA.com

Name

www

.contosoFedirkoA.com

Type

A - IPv4 Address records

Alias record set ⓘ

No

TTL *

1

TTL unit

Hours

IP address

10.1.1.4

0.0.0.0

Add Cancel Give feedback

Add or remove favorites by pressing C

Ну і пінгуємо щоб перевірити що все ок

The screenshot shows a terminal window with the following text: PS /home/fedirko816> nslookup www.contosofedirkoa.com ns1-05.azure-dns.com. Server: ns1-05.azure-dns.com. Address: 13.107.236.5#53 Name: www.contosofedirkoa.com Address: 10.1.1.4 PS /home/fedirko816> []

PS /home/fedirko816> nslookup www.contosofedirkoa.com ns1-05.azure-dns.com.

Server: ns1-05.azure-dns.com.

Address: 13.107.236.5#53

Name: www.contosofedirkoa.com

Address: 10.1.1.4

PS /home/fedirko816> []

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Пошук

Створюємо приватну DNS зону

The image shows two screenshots from the Microsoft Azure portal. The top screenshot is the 'Create Private DNS Zone' wizard, and the bottom screenshot is the 'Overview' page of the created zone.

Top Screenshot: Create Private DNS Zone Wizard

The wizard is at the 'Review + Create' step. A green banner at the top indicates 'Validation passed'. The 'Basics' tab is selected.

Basics

Subscription	Azure subscription 1
Resource group	az104-rg4
Resource group location	East US
Name	private.contosofedirkoa.com

DNS Zone Record Set(s)

Number of record sets: 0 record set(s)

Virtual network link(s)

Number of Virtual Network Links: 0 virtual network link(s)

Buttons: Create, < Previous, Next >

Bottom Screenshot: Overview of private.contosofedirkoa.com

The page shows the 'Overview' tab for the Private DNS zone 'private.contosofedirkoa.com'.

Essentials

Resource group (move)	: az104-rg4	Recordsets	: 1
Location	: Global	Virtual Network Links	: 0
Subscription (move)	: Azure subscription 1	Virtual Network Links W...	: 0
Subscription ID	: 2d2c7915-d7d9-4c46-9986-e32547b9c4b		
Tags (edit)	: Add tags		

Monitoring Capabilities Tutorials Tools + SDKs Recommendations (0)

Azure Monitor Tools

- Get alerted to issues**
Create alerts to monitor resource health, usage, cost and more.
- Get started with Log Analytics**
Leverage the value of the data in Azure Monitoring Logs and perform complex operations with minimal code.
- Monitor at scale with Insights**
Get visibility into the resource's performance and health, accounting for different processes and interconnected dependencies.

Додаємо посилання на віртуальну мережу

portal.azure.com/#view/Microsoft_Azure_PrivateD...

GmailYouTubeКартыchat GPTPhotopea | Online P...Solflare

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> private.contosofedirkoa.com | Virtual Network Links >

Add Virtual Network Link

private.contosofedirkoa.com

Link name *
manufacturing-link

Virtual network details

Only virtual networks with Resource Manager deployment model are supported for linking with Private DNS zones. Virtual networks with Classic deployment model are not supported.

☐ I know the resource ID of virtual network

Subscription *
Azure subscription 1

Virtual Network *
ManufacturingVnet (az104-rg4)

Configuration

☐ Enable auto registration

CreateCancelGive feedback

Switch to BashRestartManage filesNew sessionEditor

private.contosofedirkoa.com - x

portal.azure.com/#@fedirko816gmail.onmicrosoft.com/resource/subscriptions/2d2c7915-d7d9-4c46-9986-e3254f7b9c4b/resourceGroups/az104-rg4/providers/Microsoft.Netw...

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Microsoft AzureUpgradeSearch resources, services, and docs (G+/)Copilotfedirko816@gmail.comDEFAULT DIRECTORY (FEDIRKOBL...

Home > private.contosofedirkoa.com_1760179122947 | Overview > private.contosofedirkoa.com

private.contosofedirkoa.com | Virtual Network Links

Private DNS zone

SearchAddRefreshDeleteGive feedback

OverviewActivity logAccess control (IAM)TagsDiagnose and solve problemsResource visualizerSettingsDNS ManagementRecordsetsVirtual Network LinksMonitoringAutomationHelp

Search virtual network links
Fetched 1 virtual Network link(s).
0 Virtual Network links selected

Link Name	Link Status	Virtual Network	Auto-Registration	Fallback to Intern
manufacturing-link	Completed	ManufacturingVnet	Disabled	Disabled

... Creating virtual network link
Creating virtual network link 'manufacturing-link'.

Add or remove favorites by pressing Ctrl+Shift+F

Switch to BashRestartManage filesNew sessionEditorWeb previewSettingsHelp

12°C Mostly cloudy13:4011.10.2025

Ну і додаємо один запис до набору записів

private.contosofedirkoa.com

portal.azure.com/#@fedirko816gmail.onmicrosoft.com/resource/subscriptions/2d2c7915-d7d9-4c46-9986-e3254f7b9c4b/resourceGroups/az104-rg4/providers/Microsoft.Network/privateDnsZones/private.contosofedirkoa.com/Recordsets

Microsoft Azure

Search resources, services, and docs (G+)

Copilot

fedirko816@gmail.com

Home > private.contosofedirkoa.com_1760179122947 > Overview > private.contosofedirkoa.com

private.contosofedirkoa.com | Recordsets

Private DNS zone

Search

Overview
Activity log
Access control (IAM)
Tags
Diagnose and solve problems
Resource visualizer
Settings
DNS Management
Recordsets
Virtual Network Links
Monitoring
Automation
Help

Create record set
Successfully created record set 'sensorvm'

Fetch 2 record set(s).

0 record sets selected

Name	Type	TTL	Value	Auto registered
sensorvm	A	3600	10.1.1.4	False
Ⓜ	SOA	3600	Email: azureprivatedns-host.microsoft.com Host: azureprivatedns.net Refresh: 3600 Retry: 300 Expire: 2419200 Minimum TTL: 10 Serial number: 1	False

Switch to Bash
Restart
Manage files
New session
Editor
Web preview
Settings
Help

12°C
Mostly cloudy






Пошук

ENG


12:41
11.10.2025

І все це видаляємо)

Copilot



fedirko816@gmail.com
DEFAULT DIRECTORY (FEDIRKO81...



Notifications

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...

Deleting resource group NetworkWatcherRG

Running

×

Deleting resource group NetworkWatcherRG

a few seconds ago

...

Deleting resource group az104-rg4

Running

×

Deleting resource group az104-rg4

a few seconds ago

✓

Create record set

×

Successfully created record set 'sensorvm'

a minute ago

✓

Creating virtual network link

×

Successfully created virtual network link 'manufacturing-link'.

2 minutes ago

✓

Deployment succeeded

×

Deployment 'private.contosofedirkoa.com_1760179122947' to resource group 'az104-rg4' was successful.

Go to resource

Go to resource group

3 minutes ago

×

13:43
11.10.2025

ENG

