

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

Факультет математики та інформатики
Кафедра інформаційних технологій

Інформатика і програмування

Лабораторна робота No 8

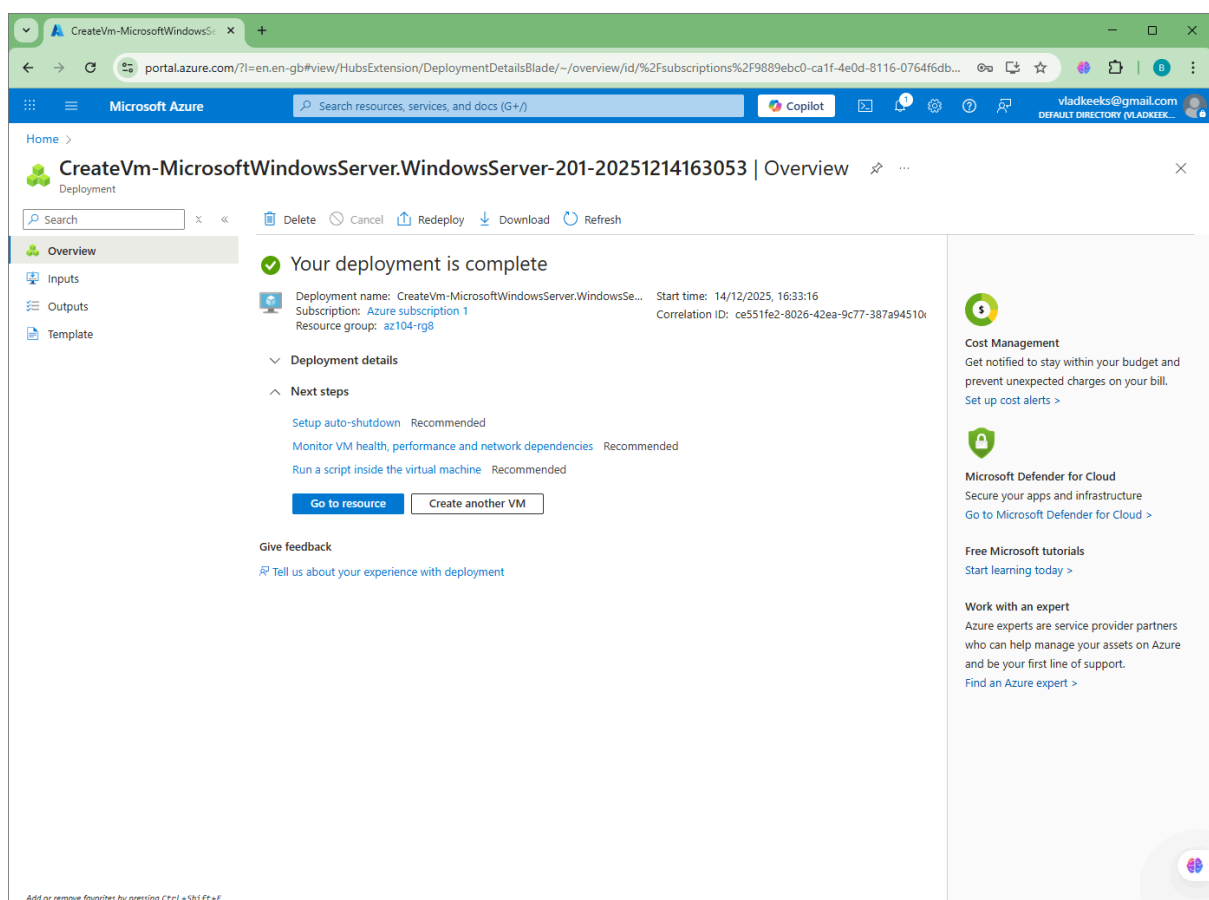
Тема: Manage Virtual Machines

Виконав: Прокутко В.В
Група ІПЗ-43
Дата: 14 грудня 2025
Викладач: Поварчук Д.Д

Івано-Франківськ – 2025

Task 1: Deploy zone-resilient Azure virtual machines by using the Azure portal

In this task, you will deploy two Azure virtual machines into different availability zones by using the Azure portal. Availability zones offer the highest level of uptime SLA for virtual machines at 99.99%. To achieve this SLA, you must deploy at least two virtual machines across different availability zones.



Task 2: Manage compute and storage scaling for virtual machines

In this task, you will scale a virtual machine by adjusting its size to a different SKU. Azure provides flexibility in VM size selection so that you can adjust a VM for periods of time if it needs more (or less) compute and memory allocated. This concept is

extended to disks, where you can modify the performance of the disk, or increase the allocated capacity.

1.

indowsServer.WindowsServer-201-20251214163053 | Overview > az104-vm1

e ☆ ⋮

Resized virtual machine

Successfully resized virtual machine 'az104-vm1' to size 'Standard_D2ds_v4'.

ℹ

If the virtual machine is currently running, changing its size will cause it to be restarted. Stopping the virtual machine may reveal additional sizes.

→

🔍

Search by VM size...

vCPUs : All

RAM (GiB) : All

Display cost : Monthly

+ Add filter

Showing 310 VM sizes.

Subscription: Azure subscription 1

Region: Canada Central

Current size: Standard_D2ds_v4

Learn more about VM sizes

Group by series

▼

VM Size ↑↓	Type ↑↓	vCPUs ↑↓	RAM (GiB) ↑↓	Data disks ↑↓
D-Series v4 The 4th generation D family sizes for your general purpose r				
D2as_v4	General purpose	2	8	4
D2ds_v4	General purpose	2	8	4
D4as_v4	General purpose	4	16	8
D4ds_v4	General purpose	4	16	8
D8as_v4	General purpose	8	32	16
D8ds_v4	General purpose	8	32	16
D-Series v3 The 3rd generation D family sizes for your general purpose r				
D2s_v3	General purpose	2	8	4
D4s_v3	General purpose	4	16	8
D8s_v3	General purpose	8	32	16
E-Series v5 The 5th generation E family sizes for your high memory nee				
E-Series v4 The 4th generation E family sizes for your high memory nee				

Under Data disks select + Create and attach a new disk. Configure the settings (leave other settings at their default values).

Microsoft Azure

Search resources, services, and docs (G+/I)

Copilot

Home > CreateVm-MicrosoftWindowsServer.WindowsServer-201-20251214163053 | Overview > az104-vm1

az104-vm1 | Disks

Virtual machine

Search

Refresh

Additional settings

Feedback

Troubleshoot

Connect

Networking

- Network settings
- Load balancing
- Application security groups
- Network manager

Settings

- Disks
- Extensions + applications
- Operating system
- Configuration
- Advisor recommendations
- Properties
- Locks

Availability + scale

- Size
- Availability + scaling

Security

- Backup + disaster recovery

The configuration of this virtual machine and its attached disk(s) may not allow for the disk(s) to utilize their full throughput performance. The current virtual machine size supports 48 MBps. The total for disk(s) attached to virtual machine 'az104-vm1' is 160 MBps. You can change the virtual machine size to support additional disk(s) throughput. [Learn more](#)

Ask Copilot

OS disk

Swap OS disk

Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput (...)
az104-vm1_disk1_6fdc478a7e...	Premium SSD LRS	127	500	100

Data disks

Filter by name

Showing 1 of 1 attached data disks

Create and attach a new disk

Attach existing disks

LUN	Disk name	Storage type	Size (GiB)	Max IOPS	Max thro
0	vm1-disk1	Standard HDD LRS	32	500	60

After the disk has been created, click Detach (if necessary, scroll to the right to view the detach icon), and then click Apply.

<<

Refresh
 Additional settings
 ...

▲

OS disk
 Swap OS disk

Disk name	Storage type	Size
az104-vm1_disk1_6fdc47	Premium SSD LRS	127

◀ ▶

Data disks

🔍 Filter by name

 Showing 0 of 0 attached data disks

+ Create and attach a new disk
 ...

LUN ⓘ	Disk name	Storage type
No data disks attached		

1. Set the storage type to Standard SSD, and then click Save.

Home > Storage center | Azure Disks > vm1-disk1

vm1-disk1 | Size + performance

Search

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Resource visualizer

Settings

Configuration

Size + performance

Encryption

Networking

Disk Export

Storage type: Standard SSD (locally-redundant storage)

Why are some options disabled?

Explore ways to boost disk performance

Size	Disk tier	Provisioned IOPS	Provisioned thro...	Max SI
4 GiB	E1	500	100	3
8 GiB	E2	500	100	3
16 GiB	E3	500	100	3
32 GiB	E4	500	100	3
64 GiB	E6	500	100	3
128 GiB	E10	500	100	3
256 GiB	E15	500	100	3
512 GiB	E20	500	100	3

Successfully updated disk

Successfully updated disk 'vm1-disk1'.

1. In the Data disk section, select Attach existing disks.
2. In the Disk name drop-down, select VM1-DISK1.
3. Verify the disk is now Standard SSD.
4. Select Apply to save your changes.

Microsoft Azure

Search resources, services, and docs (G+/)

Copilot

Home > az104-vm1

az104-vm1 | Disks

Virtual machine

Search

Refresh

Additional settings

Feedback

Troubleshoot

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Resource visualizer

Connect

Networking

Network settings

Load balancing

Application security groups

Network manager

Settings

Disks

Extensions + applications

Operating system

Configuration

Advisor recommendations

Properties

Updated virtual machine

Successfully updated virtual machine 'az104-vm1'.

The configuration of this virtual machine and its attached disk(s) may not allow for the disk(s) to utilize their full throughput performance. The current virtual machine size supports 48 MBps. The total for disk(s) attached to virtual machine 'az104-vm1' is 200 MBps. You can change the virtual machine size to support additional disk(s) throughput. [Learn more](#)

Ask Copilot

OS disk

Swap OS disk

Disk name	Storage type	Size (GiB)	Max IOPS	Max th
az104-vm1_disk1_6fdc47f	Premium SSD LRS	127	500	100

Data disks

Filter by name

Showing 1 of 1 attached data disks

Create and attach a new disk

Attach existing disks

LUN	Disk name	Storage type	Size (GiB)	Max IOPS
0	vm1-disk1	Standard SSD LRS	32	500

Task 3: Create and configure Azure Virtual Machine Scale Sets

In this task, you will deploy an Azure virtual machine scale set across availability zones. VM Scale Sets reduce the administrative overhead of automation by enabling you to configure metrics or conditions that allow the scale set to horizontally scale, scale in or scale out.

The screenshot displays the Microsoft Azure portal interface for a Virtual Machine Scale Set (VMSS) named 'vmss1'. The browser address bar shows the URL: `portal.azure.com/?l=en-en-gb#@vladkeeksgmail.onmicrosoft.com/resource/subsc...`. The page header includes the 'Microsoft Azure' logo, a search bar, and a 'Copilot' button.

The main content area is titled 'vmss1' and 'Virtual machine scale set'. It features a left-hand navigation pane with options like 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', 'Diagnose and solve problems', 'Instances', 'Resource visualizer', 'Networking', 'Settings', 'Availability + scale', 'Security', 'Operations', 'Monitoring', 'Automation', and 'Help'. The 'Overview' tab is selected.

The 'Overview' tab displays a list of actions (Refresh, Start, Restart, Stop, Delete, Reimage, Move) and a 'JSON View' link. Below this, the 'Essentials' section provides key information:

- Resource group: [az104-rg8](#) (move)
- Status: [2 out of 2 succeeded](#)
- Subscription: [Azure subscription 1](#)
- Location: [Canada Central](#) (move)
- Subscription ID: 9889ebc0-ca1f-4e0d-8116-0764f6dbd196
- Operating system: Windows
- Size: [Standard_D2s_v3 \(2 instances\)](#)
- Public IP address: [4.239.192.101](#)
- Public IP address (IPv6): -
- Virtual network/subnet: [vmss-vnet/snet-canadacentral-1](#)
- Orchestration mode: Uniform
- Time created: 12/14/2025, 3:04:53 PM UTC

Below the 'Essentials' section, there are tabs for 'Properties', 'Monitoring', 'Capabilities', and 'Recommendations (0)'. The 'Properties' tab is active, showing details for the 'Virtual machine profile' and 'Azure Spot'.

Virtual machine profile

- Operating system: Windows
- Capacity reservation group: -
- Hibernation: Disabled

Azure Spot

- Azure Spot: Disabled

Status

- Provisioning state: ✔ Succeeded
- Power state: [2 out of 2 instances running](#)

Networking

- Public IP address: [4.239.192.101](#)
- Public IP address (IPv6): -






At the bottom left, a note states: 'Add or remove favorites by pressing Ctrl+Shift+F'.


Task 4: Scale Azure Virtual Machine Scale Sets

In this task, you scale the virtual machine scale set using a custom scale rule.

1. Select Go to resource or search for and select the vmss1 scale set.
2. Choose Availability + Scale from the left side menu, then choose Scaling.

there is error idk why


 Save  Discard  Refresh  Logs  Feedback


 There was an error saving setting for resource 'vmss1'. Detail message '{"error": [{"code": "MissingSubscriptionRegistration", "message": "The subscription is not registered to use namespace 'microsoft.insights'. See https://aka.ms/rps-not-found for how to register subscriptions.", "details": [{"code": "MissingSubscriptionRegistration", "target": "microsoft.insights", "message": "The subscription is not registered to use namespace 'microsoft.insights'. See https://aka.ms/rps-not-found for how to register subscriptions."}]}]'. Please try again in a few moments.

Configure Scale-In Policy Predictive charts Run history JSON Notify ...

Autoscale is a built-in feature that helps applications perform their best when demand changes. You can choose to scale your resource manually to a specific instance count, or via a custom Autoscale policy that scales based on metric(s) thresholds, or schedule instance count which scales during designated time windows. Autoscale enables your resource to be performant and cost effective by adding and removing instances based on demand. [Learn more about Azure Autoscale](#) or [view the how-to video](#).

Choose how to scale your resource

**Manual scale**
Maintain a fixed instance count

**Custom autoscale**
Scale on any schedule, based on any metrics or predictively

Custom autoscale

Task 5: Create a virtual machine using Azure PowerShell (option 1)

ResourceGroupName	Name	Location	VmSize	OsType	NIC	Provisioning	Zone	PowerState	MaintenanceAllowed
az104-rg8	myPSVM	eastus	Standard_D2s_v3	Windows	myPSVM	Succeeded	1	VM running	
az104-rg8	az104-vm1	canadacentral	Standard_D2ds_v4	Windows	az104-vm1495_z1	Succeeded	1	VM running	
az104-rg8	az104-vm2	canadacentral	Standard_D2s_v3	Windows	az104-vm1901_z2	Succeeded	2	VM running	

PS /home/vladkeeks> █

```
PS /home/vladkeeks> Stop-AzVM`
>> -ResourceGroupName 'az104-rg8'`
>> -Name 'myPSVM'

Virtual machine stopping operation
This cmdlet will stop the specified virtual machine. Do you want to continue?
[Y] Yes [N] No [S] Suspend [?] Help (default is "Y"): y

OperationId : c1fdcbe2-ace8-4cc6-8330-31a31d776ce3
Status      : Succeeded
StartTime   : 12/14/2025 3:22:35 PM
EndTime     : 12/14/2025 3:23:21 PM
Error       :

PS /home/vladkeeks> █
```

ResourceGroupName	Name	Location	VmSize	OsType	NIC	Provisioning	Zone	PowerState	MaintenanceAllowed
AZ104-RG8	myPSVM	eastus	Standard_D2s_v3	Windows	myPSVM	Succeeded	1	VM deallocated	
AZ104-RG8	az104-vm1	canadacentral	Standard_D2ds_v4	Windows	az104-vm1495_z1	Succeeded	1	VM running	
AZ104-RG8	az104-vm2	canadacentral	Standard_D2s_v3	Windows	az104-vm1901_z2	Succeeded	2	VM running	

PS /home/vladkeeks> █

overall

az104-rg8 - Microsoft Azure

portal.azure.com/#@vladkeeksgmail.onmicrosoft.com/resource/subscriptions/9689ebcd-ca1f-4e0d-8116-0764f6dbd196/resourceGroups/az104-rg8/overview

Microsoft Azure

Search resources, services, and docs (3+7)

Copilot

vladkeeks@gmail.com

Home > Resource Manager > Resource groups >

Resource Manager

Default directory

Search

Create Manage view

Resource groups

Tags

Organization

Service groups

Management groups

Subscriptions

Tools

Resource graph explorer

Resource graph queries

Resource visualizer

Resource explorer

ARM API playground

Resource mover

Deployments

Templates

Template specs

Help

Support + troubleshooting

az104-rg8

Resource group

Search

Create Manage view Delete resource group Refresh Export to CSV Open query Assign tags 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

Help

Essentials

Resources Recommendations

Filter for any field...

Type equals all Location equals all Add filter

Name	Type	Location
az104-vm1	Virtual machine	Canada Central
az104-vm1-ip	Public IP address	Canada Central
az104-vm1-nsg	Network security group	Canada Central
az104-vm1-vnet	Virtual network	Canada Central
az104-vm1495_z1	Network interface	Canada Central
az104-vm1901_z2	Network interface	Canada Central
az104-vm1_disk1_6f0c478a7ee143759e121c	Disk	Canada Central
az104-vm2	Virtual machine	Canada Central
az104-vm2-ip	Public IP address	Canada Central
az104-vm2_disk1_9c9f87f638c04a2aad0048	Disk	Canada Central

Showing 1 - 10 of 21. Display count: auto

1 2 3 >

Add or remove favorites by pressing Ctrl + Shift + F

Add or remove favorites by pressing Ctrl + Shift + F

Give feedback

costs

Влад Прокутко - Microsoft Ac...

portal.azure.com/#view/Microsoft_Azure_GTM/Billing.MenuView/~/?overview/scopeld/%2Fproviders%2FMicrosoft.Billing%2FbillingAccounts%2F6e5385f6-1cd7-5c64-c04a-9a831b7745c7%3A5f1f995-a27d-4191-a219-dd166dc78fa_2019-05-31/...

Microsoft Azure

Search resources, services, and docs (G+/)

Copilot

vladkeeks@gmail.com
DEFAULT DIRECTORY (v1-ACADE...

All services >

Влад Прокутко
Billing account

Search

Get startedSummaryTutorials & What's new

Overview

Access control (IAM)

Billing scopes

Diagnose and solve problems

Cost management

Cost analysis

Cost alerts

Budgets

Advisor recommendations

Billing

Invoices

Payment methods

Payment history

Reservation transactions

Billing profiles

Benefits (preview)

> Products + services

> Settings

> Support + troubleshooting

Amount due

US\$0.00

No payment needed

View invoices

Upcoming invoices

Available on 06/01/2026

Billing period
01/12/2025 - 31/12/2025

Pre-tax total so far
US\$0.00

Invoices over time

No invoices in last 6 months

Total amount
10.00

Spending rate and forecast

Current charge
US\$10.44

Forecast

View details

This month's top products by charges

Virtual Machines Dv3 Series W...
US\$4.48

Application Gateway Standard ...
US\$2.52

Azure App Service Premium v2...
US\$1.40

Other purchases
US\$2.04

View details

Billing alerts (0)

No billing alerts to display

Shortcuts

Download usage and prices

Manage payment methods

View billing subscriptions

Share monthly invoice by email

View your support plan

Give feedback

Credits remaining

US\$189.56

US\$10.44 used of US\$200

Used

Amount remaining

View credits

Add or remove favorites by pressing Ctrl + Shift + F