

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

Факультет математики та інформатики
Кафедра інформаційних технологій

Інформатика і програмування

Лабораторна робота № 8

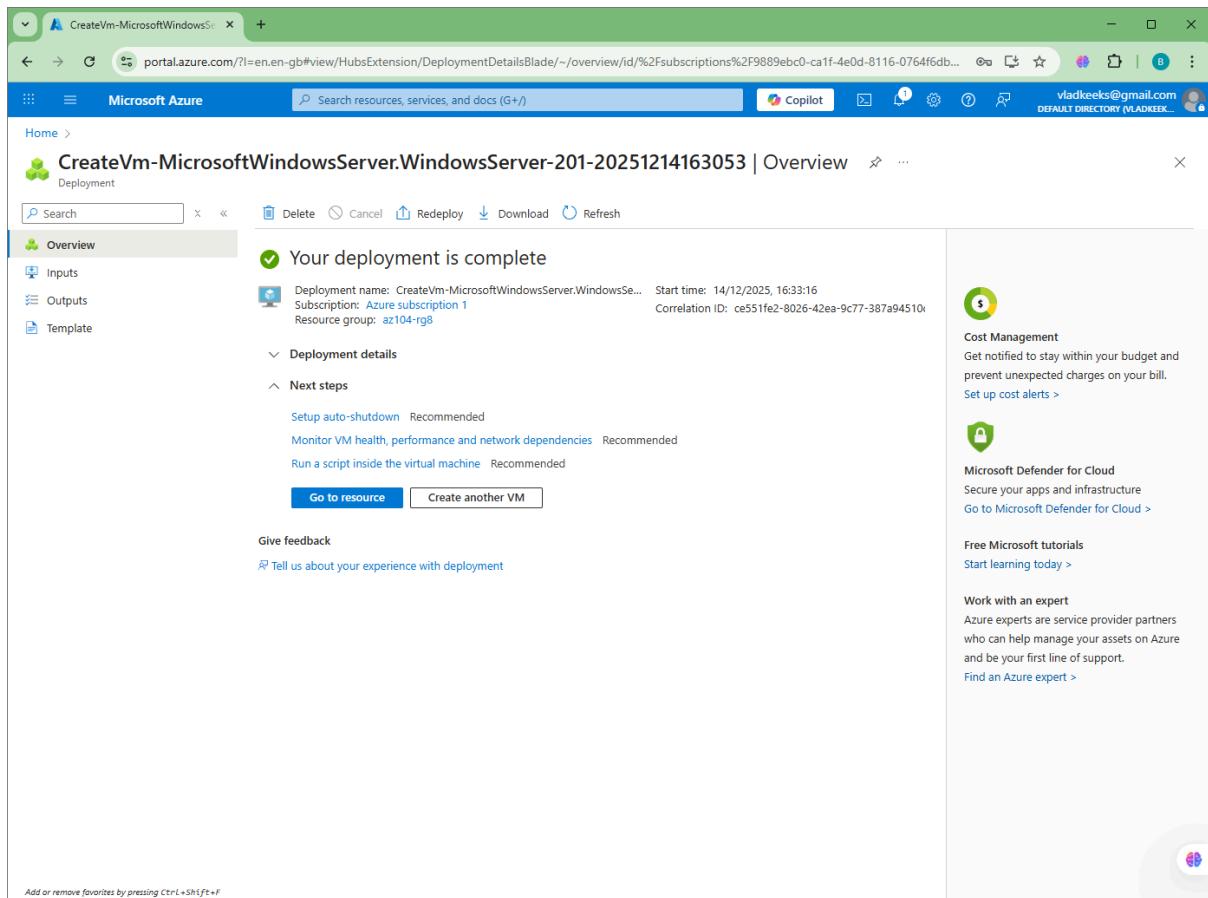
Тема: Manage Virtual Machines

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.

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

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

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 ↑↓
The 4th generation D family sizes for your general purpose needs				
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
The 3rd generation D family sizes for your general purpose needs				
D2s_v3	General purpose	2	8	4
D4s_v3	General purpose	4	16	8
D8s_v3	General purpose	8	32	16
The 5th generation E family sizes for your high memory needs				
The 4th generation F family sizes for your high memory needs				

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

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](#)

LUN	Disk name	Storage type	Size (GiB)	Max IOPS	Max throughput
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.

S



...



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

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

Disk

Search Explore ways to boost disk performance

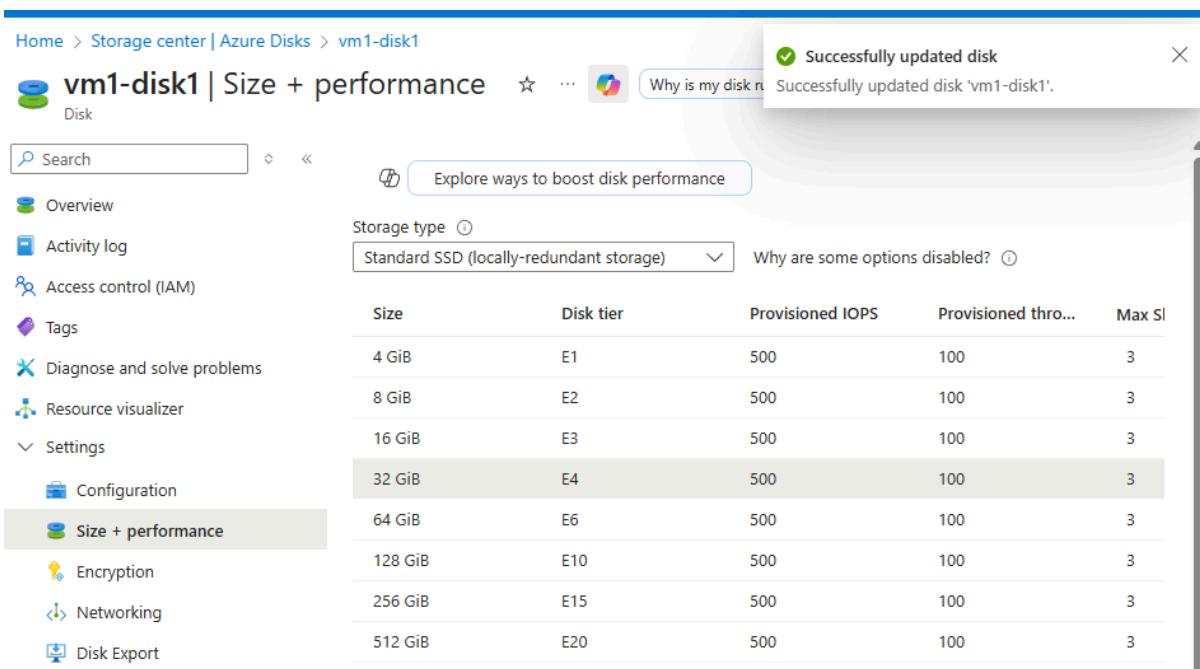
Storage type: Standard SSD (locally-redundant storage)

Why are some options disabled?

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

Overview Activity log Access control (IAM) Tags Diagnose and solve problems Resource visualizer Settings Configuration Size + performance Encryption Networking Disk Export

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

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](#)

OS disk Swap OS disk

Disk name	Storage type	Size (GiB)	Max IOPS	Max th...
az104-vm1_disk1_6fdc47e	Premium SSD LRS	127	500	100

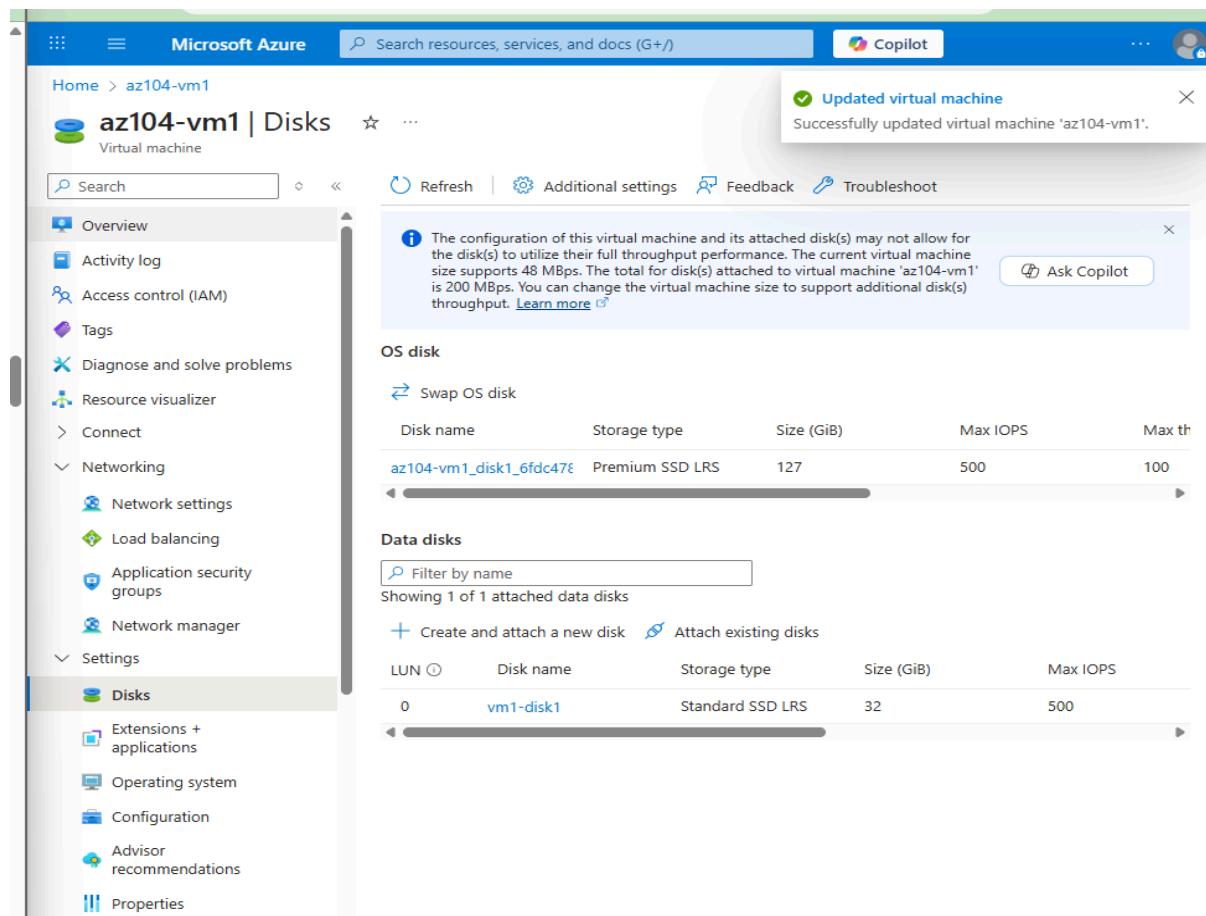
Data disks Filter by name Showing 1 of 1 attached data disks

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

Extensions + applications Operating system Configuration Advisor recommendations Properties

Updated virtual machine
Successfully updated virtual machine 'az104-vm1'.



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 shows the Microsoft Azure portal interface with the URL portal.azure.com/ in the address bar. The main title is "vmss1 - Microsoft Azure". The left sidebar shows navigation options like Home, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Instances, Resource visualizer, Networking, Settings, Availability + scale, Security, Operations, Monitoring, Automation, and Help. The main content area is titled "Overview" for the "vmss1" Virtual machine scale set. It displays the following details:

Essentials	Value
Resource group	az104-rg8
Operating system	Windows
Status	2 out of 2 succeeded
Size	Standard D2s v3 (2 instances)
Subscription	Azure subscription 1
Public IP address	4.239.192.101
Location	Canada Central
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 "Tags" buttons for "edit" and "Add tags".

The "Properties" tab is selected, showing sections for "Virtual machine profile", "Status", "Azure Spot", and "Networking".

At the bottom left, there is a note: "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

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

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.

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	Maintenance Allowed
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> [REDACTED]
```

```
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> [REDACTED]
```

ResourceGroupName	Name	Location	VmSize	OsType	NIC Provisioning Zone	PowerState	Maintenance Allowed
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> [REDACTED]
```

overall

costs

The screenshot shows the Microsoft Azure Billing Summary page for a user named Vlad Prokutko. The page is divided into several sections:

- Amount due:** US\$0.00 (No payment needed). Includes a "View invoices" button.
- Upcoming invoices:** Available on 09/01/2026. Billing period: 01/12/2025 - 31/12/2025. Pre-tax total so far: US\$0.00. Includes a "View details" button.
- Invoices over time:** A chart showing no invoices in the last 6 months. Total amount: 0.00. Includes a "View details" button.
- Spending rate and forecast:** A chart showing current charges (US\$10.44) and forecast (US\$10.44) from 14/12 to 28/12. Includes a "View details" button.
- This month's top products by charges:** A donut chart showing charges for different products:
 - Virtual Machine Dv3 Series W...: US\$4.48
 - Application Gateway Standard ...: US\$2.52
 - Azure App Service Premium v3...: US\$1.40
 - Other purchases: US\$2.04Includes a "View details" button.
- Billing alerts (0):** No billing alerts to display. Includes a "View details" button.
- Shortcuts:** Links to: 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). Includes a "View credits" button.

Add or remove favorites by pressing **Ctrl+Shift+F**.