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*Факультет математики та інформатики
Кафедра інформаційних технологій*

Лабораторна робота № 3

з дисципліни
"Хмарні
технології"

Тема: Manage Azure resources by using Azure
Resource Manager Templates

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Група ІПЗ-41
Дата: 20 жовтня 2025 р.

Task 1: Create an Azure Resource Manager template.

Створюємо диск

Create a managed disk

Validation passed

Basics Encryption Networking Advanced Tags **Review + create**

Basics

Subscription	Azure subscription 1
Resource group	(new) az104-rg3
Region	Poland Central
Disk name	az104-disk1
Availability zone	No infrastructure redundancy required
Source type	None
VM architecture	x64

Size

Size	32 GiB
Performance tier	P4 - 120 IOPS, 25 MB/s (default)
Storage type	Premium SSD LRS

Encryption

Encryption type	Platform-managed key
-----------------	----------------------

Advanced

[Create](#) < Previous Next > [Download a template for automation](#)

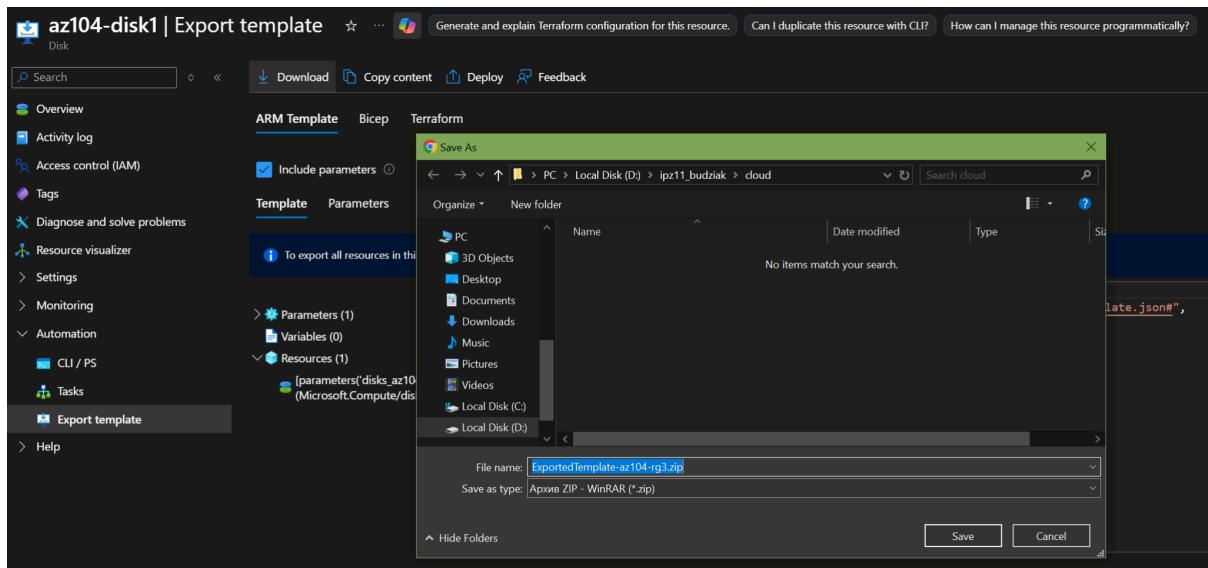
Успішно створено

Deployment succeeded

Deployment 'CreateDiskBlade-20251020170149' to resource group 'az104-rg3' was successful.

[Go to resource](#) [Pin to dashboard](#)

Експортуємо шаблон



У завантаженому архіві отримуємо два JSON файли (template and parameters)

Task 2: Edit an Azure Resource Manager template and redeploy the template.

Деплоїмо власний шаблон

Home > Custom deployment >

Edit template ...

Edit your Azure Resource Manager template

+ Add resource ↑ Quickstart template ⌂ Load file ⌄ Download

```
1 {
2   "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
3   "contentVersion": "1.0.0.0",
4   "parameters": {},
5   "resources": []
6 }
```

Save

Discard

Загрузили власний шаблон і трішки його змінили

Home > Custom deployment >

Edit template

Edit your Azure Resource Manager template

+ Add resource ↑ Quickstart template ⌂ Load file ⌄ Download

```
1  {
2      "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
3      "contentVersion": "1.0.0.0",
4      "parameters": {
5          "disk_name": [
6              "defaultValue": "az104-disk2",
7              "type": "String"
8          ]
9      },
10     "variables": {},
11     "resources": [
12         {
13             "type": "Microsoft.Compute/disks",
14             "apiVersion": "2025-01-02",
15             "name": "[parameters('disk_name')]",
16             "location": "polandcentral",
17             "sku": {
18                 "name": "Premium_LRS",
19                 "tier": "Premium"
20             },
21             "properties": {
22                 "creationData": {
23                     "createOption": "Empty"
24                 },
25                 "diskSizeGB": 32,
26                 "diskIOPSReadWrite": 120,
27                 "diskMBpsReadWrite": 25,
28                 "encryption": {
29                     "enabled": true
30                 }
31             }
32         }
33     ]
34 }
```

Save

Discard

Edit parameters

[Load file](#) [Download](#)

```
1  {
2      "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentParameters.json#",
3      "contentVersion": "1.0.0.0",
4      "parameters": {
5          "disk_name": {
6              "value": null
7          }
8      }
9  }
```

[Save](#)

[Discard](#)

Завершаем деплой

Custom deployment ...  How do I roll back a failed ARM deployment? Automate Azure deployments with CLI

Deploy from a custom template

New! Deployment Stacks let you manage the lifecycle of your deployments. Try it now →

Select a template **Basics** Review + create

Template

 Customized template  1 resource  Edit template  Edit parameters  Visualize

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription *  Azure subscription 1 

Resource group *  az104-rg3 
[Create new](#)

Instance details

Region *  (Europe) Poland Central 

Disk_name az104-disk2 

[Previous](#) [Next](#) **Review + create**

Custom deployment ...  How do I roll back a failed ARM deployment? Automate Azure deployments with CLI

Deploy from a custom template

Select a template Basics Review + create

Summary

 Customized template
1 resource

Terms

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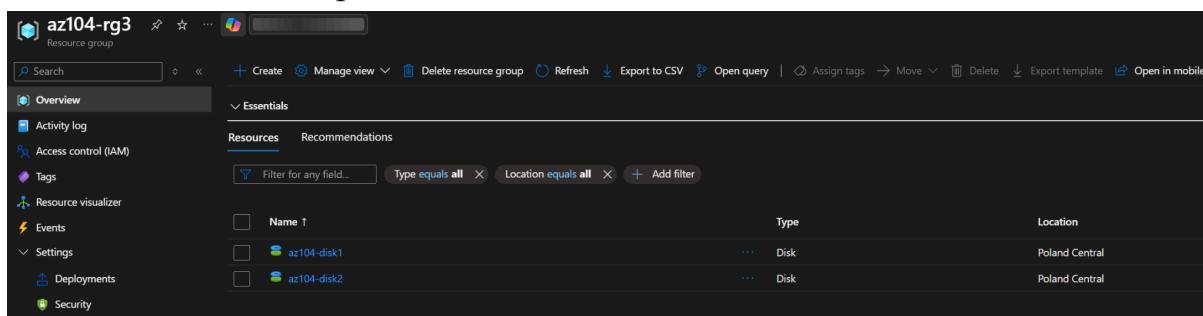
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Маємо наші два створені диски



Name	Type	Location
az104-disk1	Disk	Poland Central
az104-disk2	Disk	Poland Central

Task 3: Configure the Cloud Shell and deploy a template with Azure PowerShell.

Налаштовуємо CLI

Deployment is in progress

Subscription: Azure subscription 1

Resource group: az104-rg3

Storage account: nemessi10

File share: fs-cloudshell

Region: Germany West

Успішно

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

Storage fileshare subscription bb797eda-d832-402a-93a2-b4a307a0487e is not registered to Microsoft.CloudShell Namespace. Please follow these instructions "https://aka.ms/RegisterCloudShell" to register. In future, unregistered subscriptions will have restricted access to CloudShell service.

MOTD: Azure Cloud Shell now includes Predictive IntelliSense! Learn more: https://aka.ms/CloudShell/IntelliSense

VERBOSE: Authenticating to Azure ...
WARNING: You're using Az version 14.3.0. The latest version of Az is 14.5.0. Upgrade your Az modules using the following commands:
Update-PSResource Az -Whatif -- Simulate updating your Az modules.
Update-PSResource Az -- Update your Az modules.
VERBOSE: Building your Azure drive ...
PS /home/roman>
```

Завантажуємо наші два JSON файли

```
PowerShell Requesting a Cloud Shell.Succeeded.
Connecting terminal...

Storage fileshare subscription bb797eda-d832-402a-93a2-b4a307a0487e is not registered to Microsoft.CloudShell Namespace. Please follow these instructions "https://aka.ms/RegisterCloudShell" to register. In future, unregistered subscriptions will have restricted access to CloudShell service.

MOTD: Azure Cloud Shell now includes Predictive IntelliSense! Learn more: https://aka.ms/CloudShell/IntelliSense

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/roman> 
```

Upload destination: /home/roman

parameters.json

COMPLETE

У template.json змінюємо називу диска на az104-disk3

```
PowerShell FILES template.json
1 {
  "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
  "contentVersion": "1.0.0.0",
  "parameters": {
    "disk_name": {
      "defaultValue": "az104-disk",
      "type": "String"
    }
  },
  "variables": {},
  "resources": [
    {
      "type": "Microsoft.Compute/disks",
      "apiVersion": "2025-01-02",
      "name": "[parameters('disk_name')]",
      "location": "polandcentral",
      "sku": {
        "name": "Premium_LRS",
        "tier": "Premium"
      },
      "properties": {
        "creationData": {
          "createOption": "Empty"
        },
        "diskSizeGB": 32,
        "diskTOSReadwrite": 120,
        "lun": 0
      }
    }
  ]
}

MOTD: Azure Cloud Shell now includes Predictive IntelliSense! Learn more: https://aka.ms/CloudShell/IntelliSense

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/roman>
```

Усе успішно

```

PS /home/roman> New-AzResourceGroupDeployment -ResourceGroupName az104-rg3 -TemplateFile template.json -TemplateParameterFile parameters.json

DeploymentName      : template
ResourceGroupName   : az104-rg3
ProvisioningState  : Succeeded
Timestamp          : 10/20/2025 2:41:05 PM
Mode               : Incremental
TemplateLink       :
Parameters         :
    Name           Type           Value
    ======        ======        ======
    disks_az104_disk1_name String        "az104-disk3"

Outputs            :
DeploymentLogLevel : Information

PS /home/roman> Get-AzDisk | ft

ResourceGroupName ManagedBy ManagedByExtended Sku                                         Zones TimeCreated          OsType HyperVGeneration CreationData
-----          -----          -----          -----          -----          -----          -----          -----          -----          -----
AZ104-RG3        {}           Microsoft.Azure.Management.Compute.Models.DiskSku 10/20/2025 2:04:15 PM Microsoft.Azure.Management.Compute.Models.DiskSku
AZ104-RG3        {}           Microsoft.Azure.Management.Compute.Models.DiskSku 10/20/2025 2:22:58 PM Microsoft.Azure.Management.Compute.Models.DiskSku
AZ104-RG3        {}           Microsoft.Azure.Management.Compute.Models.DiskSku 10/20/2025 2:40:58 PM Microsoft.Azure.Management.Compute.Models.DiskSku

PS /home/roman>

```

Task 4: Deploy a template with the CLI.

Цього разу будемо працювати з bash

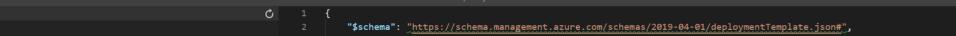
```
Bash    v | ⌂ ? ⌘ ⌚ ⌛ ⌜ ⌝ ⌟

Requesting a Cloud Shell.Succeeded.
Connecting terminal...

Storage fileshare subscription bb797eda-d832-402a-93a2-b4a307a0487e is not registered to Microsoft.CloudShell
register. In future, unregistered subscriptions will have restricted access to CloudShell service.

roman [ ~ ]$ ls
clouddrive  Microsoft  parameters.json  template.json
roman [ ~ ]$
```

Змінюємо назву для диску на az104-disk4



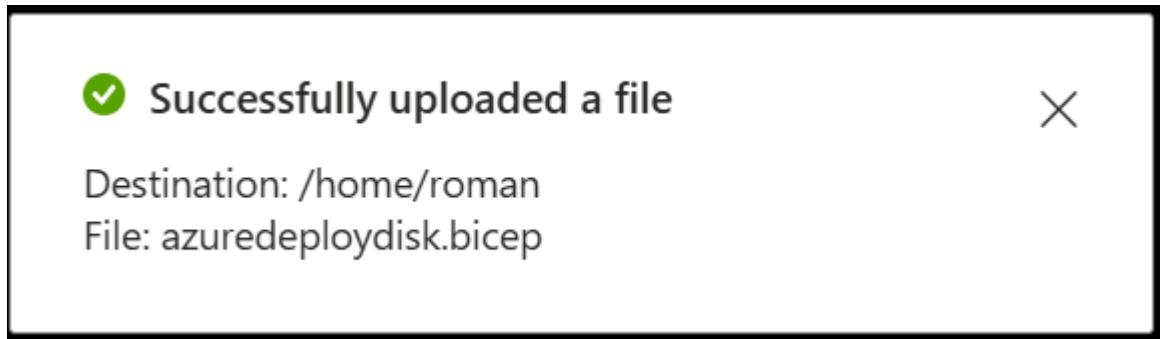
```
template.json
1  {
2    "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
3    "parameters": {
4      "disk1_name": {
5        "defaultValue": "az104-disk4",
6        "type": "String"
7      }
8    },
9    "variables": {},
10   "resources": [
11     {
12       "type": "Microsoft.Compute/disks",
13       "apiVersion": "2025-01-02",
14       "name": "[parameters('disk1_name')]",
15       "location": "polandcentral",
16       "sku": {
17         "name": "Standard_LRS"
18       }
19     }
20   ]
21 }
```

Успішно створено 4-ий диск

az disk list --output table						
Name	ResourceGroup	Location	Zones	Sku	SizeGb	ProvisioningState
az104-disk1	AZ104-RG3	polandcentral		Premium_LRS	32	Succeeded
az104-disk2	AZ104-RG3	polandcentral		Premium_LRS	32	Succeeded
az104-disk3	AZ104-RG3	polandcentral		Premium_LRS	32	Succeeded
az104-disk4	AZ104-RG3	polandcentral		Premium_LRS	32	Succeeded

Task 5: Deploy a resource by using Azure Bicep.

Завантажуємо необхідний файл для роботи



Змінюємо полі у файлі на необхідні нам значення

```
azuredisk.bicep
FILESCODECOPY
1 @description('Name of the managed disk to be copied')
2 param managedDiskName string = 'az104-disk5'
3
4 @description('Disk size in GiB')
5 @minValue(4)
6 @maxValue(65536)
7 param diskSizeInGiB int = 32
8
9 @description('Disk IOPS value')
10 @minValue(100)
11 @maxValue(160000)
12 param diskIopsReadWrite int = 100
13
14 @description('Disk throughput value in MBps')
15 @minValue(1)
16 @maxValue(2000)
17 param diskMbpsReadWrite int = 10
18
19 @description('Location for all resources.')
20 param location string = resourceGroup().location
21
22 resource managedDisk 'Microsoft.Compute/disks@2020-09-30' = {
23     name: managedDiskName
24     location: location
25     sku: {
26         name: 'StandardSSD_LRS'
```

Успішно створено 5-ий диск

Name	ResourceGroup	Location	Zones	Sku	SizeGb	ProvisioningState
az104-disk1	AZ104-RG3	polandcentral		Premium_LRS	32	Succeeded
az104-disk2	AZ104-RG3	polandcentral		Premium_LRS	32	Succeeded
az104-disk3	AZ104-RG3	polandcentral		Premium_LRS	32	Succeeded
az104-disk4	AZ104-RG3	polandcentral		Premium_LRS	32	Succeeded
az104-disk5	AZ104-RG3	polandcentral		StandardSSD_LRS	32	Succeeded

Висновок: Вивчив як автоматизувати розгортання ресурсів. Дізнався про шаблони Azure Resource Manager і шаблони Bicep. Вивчив різні способи розгортання шаблонів.