

Lab 01: Manage Microsoft Entra ID Identities

1) Task 1: Create and configure user accounts

I created a user and also invited an external user.

+ New user ▾ Delete Download users Bulk operations ▾ Refresh Manage view ▾ Per-user MFA Got feedback?					
Azure Active Directory is now Microsoft Entra ID. Learn more					
Search Add filter					
3 users found					
<input type="checkbox"/>	Display name ↑	User principal name ↑↓	User type	On-premises sy...	Identities
<input type="checkbox"/>	az104-user1	az104-user1@mothuradp...	Member	No	mothuradpavlogmail.onmicrosoft.
<input type="checkbox"/>	Pavlo	pavlo.mochurad.kb.2021_l...	Guest	No	mothuradpavlogmail.onmicrosoft.
<input type="checkbox"/>	Павло Мочурад	mothuradpavlo_gmail.co...	Member	No	MicrosoftAccount

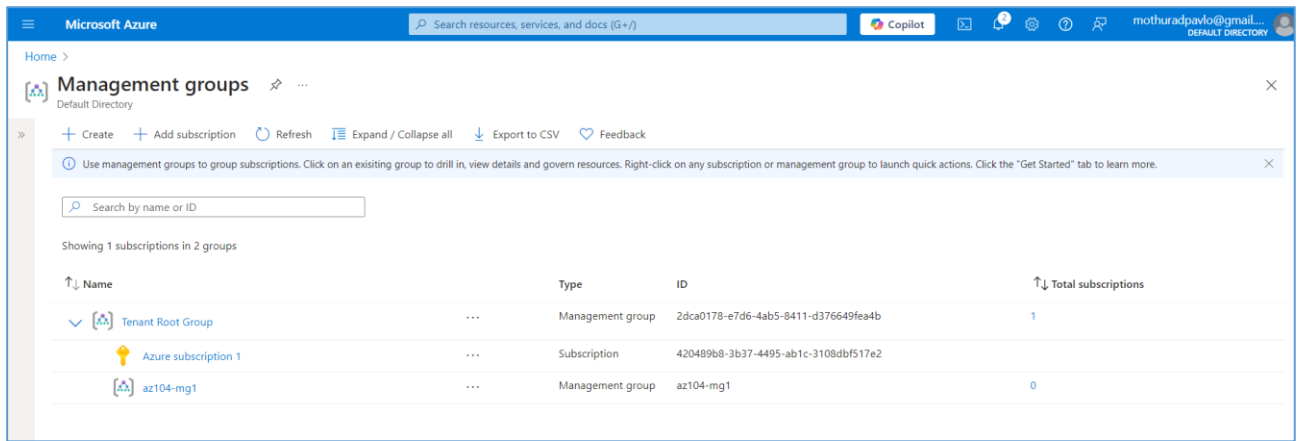
Task 2: Create groups and add members.

New group Download groups Refresh Manage view ▾ Delete Got feedback?					
Microsoft Entra has a simpler, integrated experience for managing all your Identity and Access Management needs. Try the new Microsoft Entra admin center! Learn more					
Search Add filter					
Search mode Contains					
1 group found					
<input type="checkbox"/>	Name ↑	Object Id	Group type	Membership type	Email
<input type="checkbox"/>	IT Lab Administrators	c6228dd2-901a-4b0e-9955-5117df1c1a72	Security	Assigned	

Microsoft Azure Search resources, services, and docs (G+/) Copilot					
Home > Groups All groups > IT Lab Administrators >					
Members IT Lab Administrators					
+ Add members Remove Refresh Bulk operations ▾ Columns Got feedback?					
Direct members All members					
Search by name Add filters					
<input type="checkbox"/>	Name ↑↓	Type	Email	User type	
<input type="checkbox"/>	az104-user1	User		Member	
<input type="checkbox"/>	Pavlo	User	pavlo.mochurad.kb.2021@lpnu.ua	Guest	

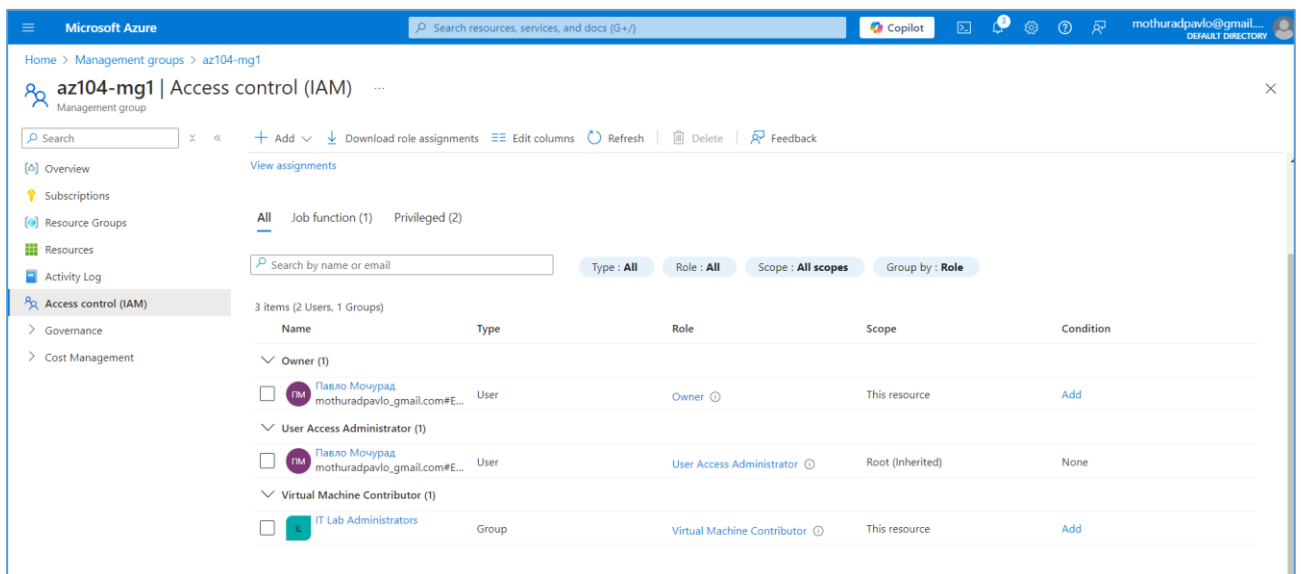
Lab 02a - Manage Subscriptions and RBAC

Task 1: Implement Management Groups

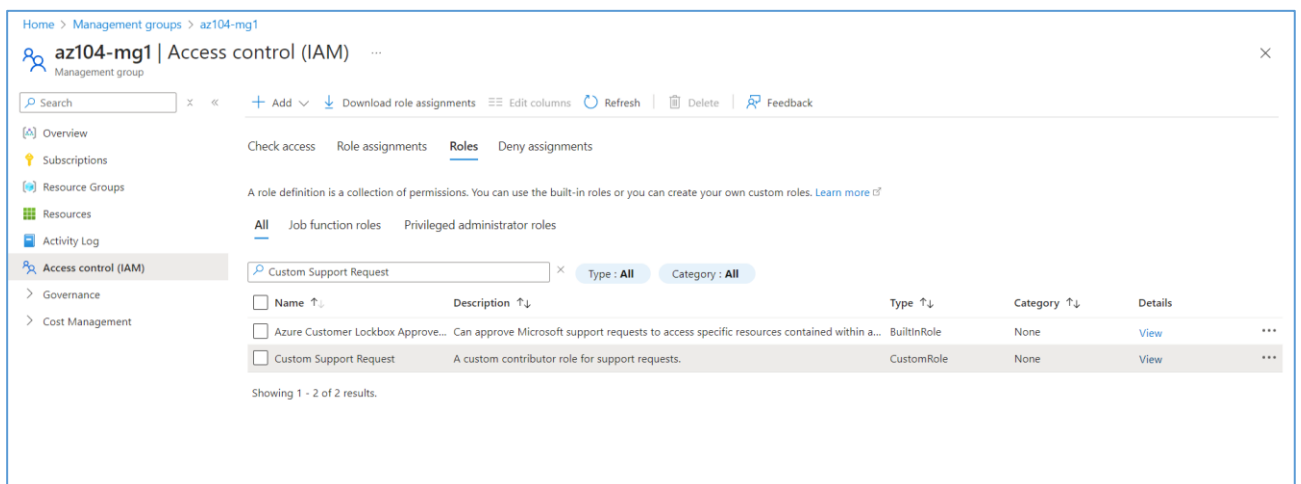


Task 2: Review and assign a built-in Azure role.

Assigned the VM Contributor role to the group from the previous lab.



Task 3: Create a custom RBAC role



Task 4: Monitor role assignments with the Activity Log

Filtered the role by role creation operation.

The screenshot shows the Azure Activity Log interface. At the top, there's a navigation bar with options like Activity, Edit columns, Refresh, Export Activity Logs, Download as CSV, Insights, Feedback, Pin current filters, and Reset filters. Below this is a search bar and a 'Quick Insights' button. The filters section shows: Management Group: az104-mg1, Subscription: None, Event severity: All, Timespan: Last 6 hours, and Operation: 1 selected. A dropdown menu for the Operation filter is open, showing 'create ro' and 'Create role assignment (Microsoft.Authorization/roleAssignments/write)' which is checked. Below the filters, it says '2 items.' and a table displays the activity log entries.

Operation name	Status	Time	Time stamp	Subscription	Event initiated by
> Create role assignment	Succeeded	16 minutes ...	Mon Oct 21...		mothuradpavlo@gmail.com
> Create role assignment	Succeeded	27 minutes ...	Mon Oct 21...		Azure Management Groups

Lab 02b - Manage Governance via Azure Policy

Task 1: Assign tags via the Azure portal

The screenshot shows the Azure portal interface for a resource group named 'az104-rg2'. The breadcrumb navigation is 'Home > Resource groups > az104-rg2'. The main heading is 'az104-rg2 | Tags' with a 'Resource group' subtitle. Below this, there are 'Delete all' and 'Feedback' buttons. A descriptive text explains that tags are name/value pairs used for categorizing resources and consolidated billing. It also includes a warning: 'Do not enter names or values that could make your resources less secure or that contain personal/sensitive information because tag data will be replicated globally.' Below the text is a table with two columns: 'Name' and 'Value'. One tag is listed: 'Cost Center' with a value of ': 000'. There are icons for deleting and adding tags at the bottom right of the table.

Name	Value
Cost Center	: 000

Task 2: Enforce tagging via an Azure Policy

After setting the policy, an error occurs when trying to create a resource without a tag.

Microsoft Azure Search resources, services, and docs (G+)

Home > Storage accounts

Create a storage account

Validation failed. View error details

Basics Advanced

View automation template

Basics

Subscription

Resource group

Location

Storage account name

Primary service

Performance

Errors

Summary Raw Error

ERROR DETAILS

Resource 'lab2bstotage' was disallowed by policy. (Code: RequestDisallowedByPolicy)

Policy: Require Cost Center tag with Default value

WAS THIS HELPFUL?

Explain with Copilot

Troubleshooting Options

[New Support Request](#)

Task 3: Apply tagging via an Azure policy

After deleting the old policy, I created a new one that would assign the tag if it didn't exist. When creating a storage account, I didn't add a tag. But after creating it, it appeared.

Microsoft Azure Search resources, services, and docs (G+)

Home > Policy

Policy | Assignments

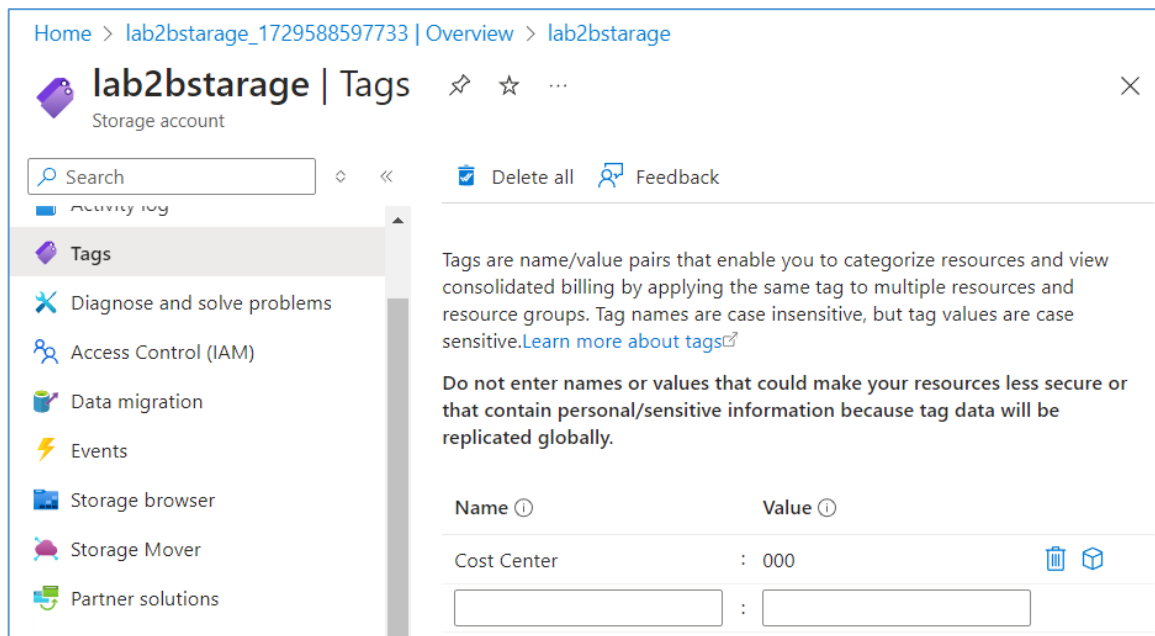
Assign policy Assign initiative Refresh

1 0 1

Assignment name | Scope | Type

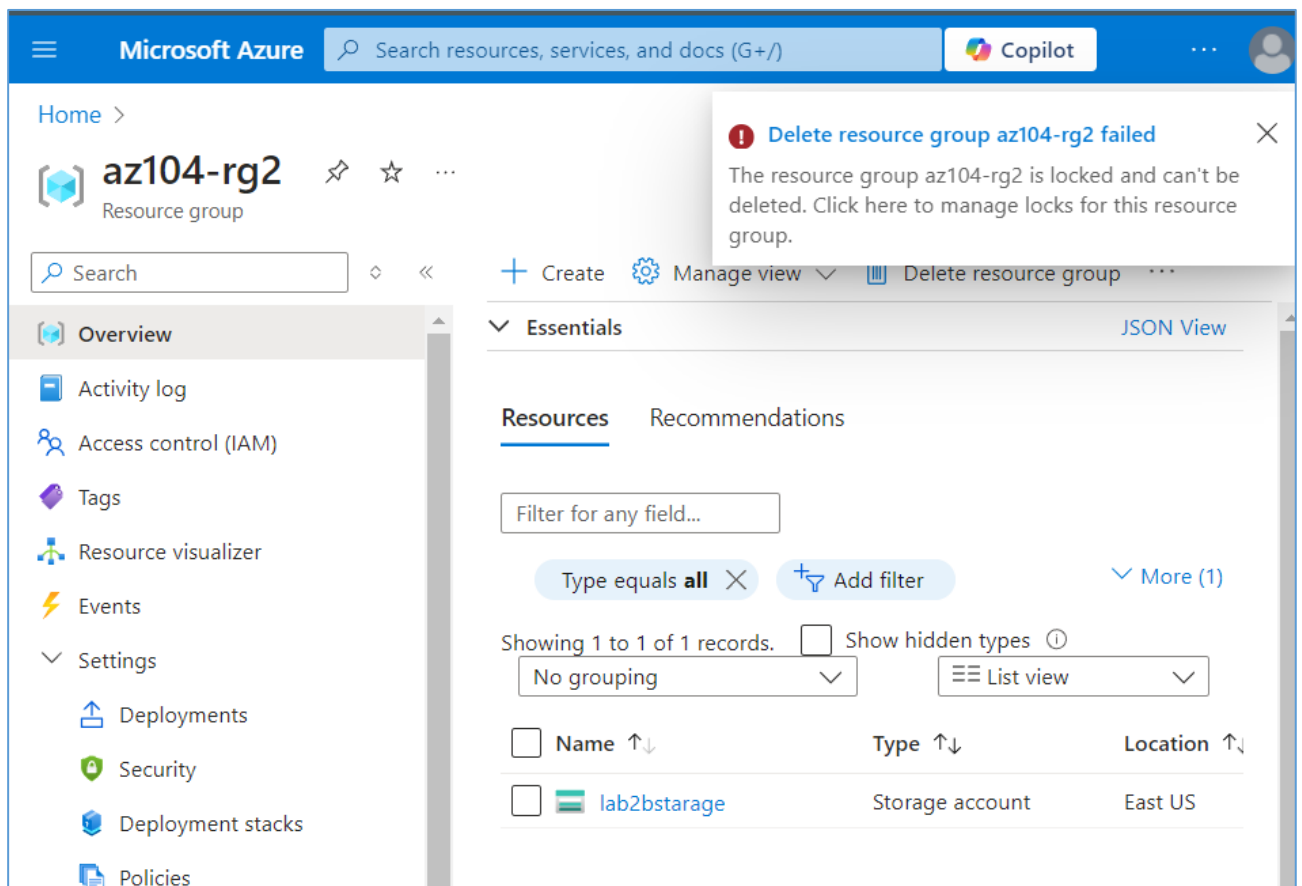
Inherit the Cost Center tag and its value 000 from the resource group if missing Azure subscription 1/az104-rg2 Policy

Edit columns



Task 4: Configure and test resource locks

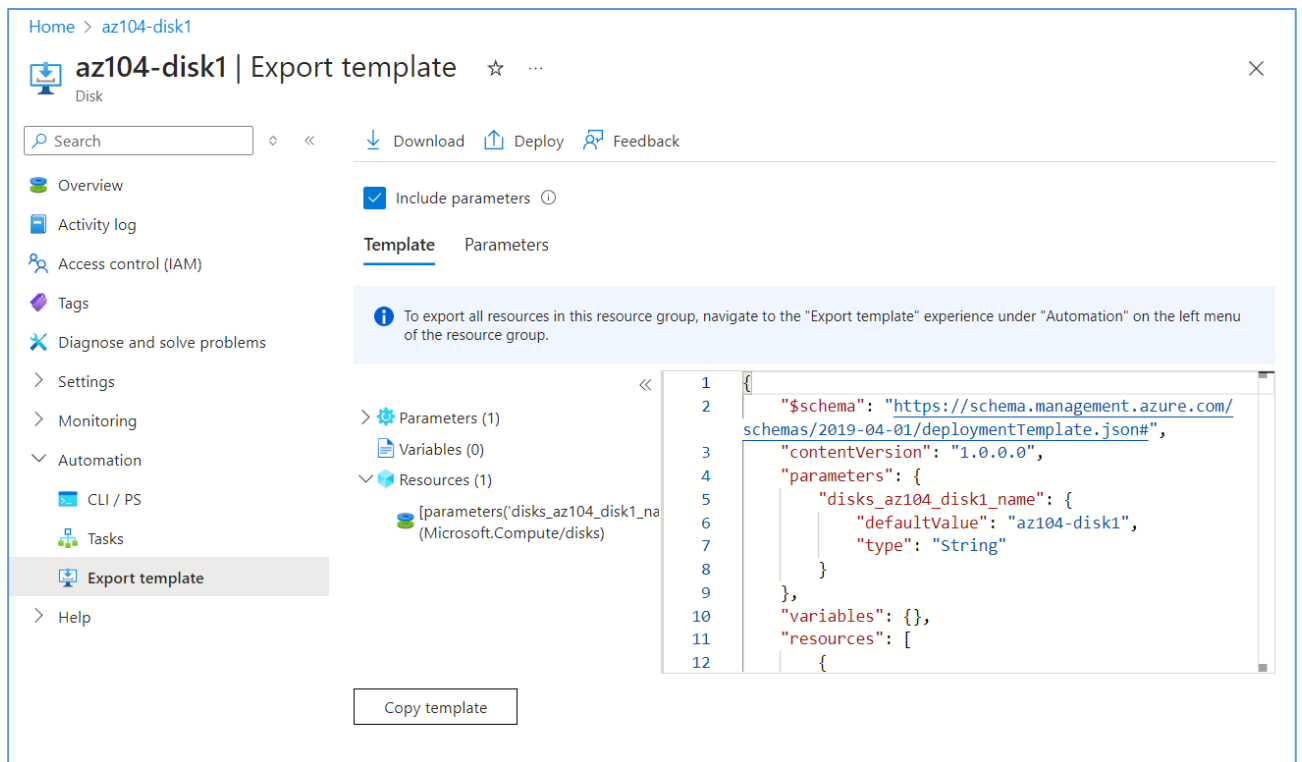
After setting up the lock, I tried to delete the resource group and got an error. This means the lock is working.



Lab 03 - Manage Azure resources by using Azure Resource Manager Templates

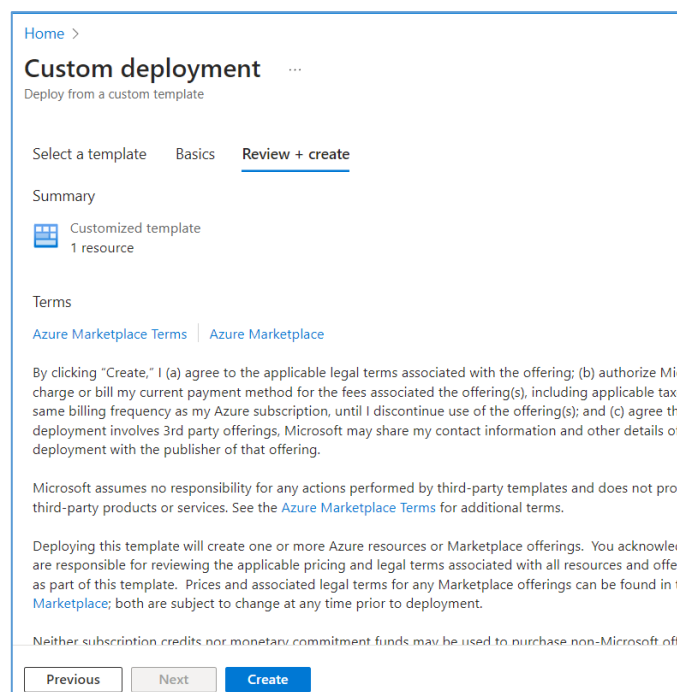
Task 1: Create an Azure Resource Manager template

I created the resource manually on the portal, then downloaded the ARM template.



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

Using the template, I changed the disk name in template.json.



Home >

Disks

Національний університет "Львівська політехніка" (edu.lpnu.ua)

+ Create Manage view Refresh Export to CSV Open query Assign tags

Filter for any field... Subscription equals all Add filter More (2)

Showing 1 to 4 of 4 records. No grouping List view

<input type="checkbox"/>	Name ↑↓	Storage type ↑↓	Size (G... ↑↓	Owner ↑↓	Resource group ↑↓
<input type="checkbox"/>	az104-disk1	Premium SSD LRS	32	-	Lab3
<input type="checkbox"/>	az104-disk2	Premium SSD LRS	32	-	Lab3
<input type="checkbox"/>	Ubuntu-22_disk1_...	Standard SSD LRS	30	Ubuntu-22	JUST-VIRTUALKA
<input type="checkbox"/>	Windows-Server_...	Premium SSD LRS	64	Windows-Server	SERVER-WIN

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

```

Microsoft Azure
Search resources, services, and docs (G+/I)
Copilot
Pavlo Mochered KB 202...
НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ ...

Home >
PowerShell
PS /home/azureuser/lab3> New-AzResourceGroupDeployment -ResourceGroupName Lab3 -TemplateFile template.json -TemplateParameterFile parameters.json

DeploymentName      : template
ResourceGroupName  : Lab3
ProvisioningState   : Succeeded
Timestamp           : 10/22/2024 10:42:52 AM
Mode                : Incremental
TemplateLink        :
Parameters          :
                      Name      Type      Value
                      =====
                      disks_az104_3 String    "az104-disk3"

Outputs
DeploymentDebugLogLevel :
PS /home/azureuser/lab3> Get-AzDisk
  
```

Lab3

Resource group

Search

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

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

Showing 1 to 3 of 3 records. Show hidden types No grouping List view

<input type="checkbox"/>	Name ↑↓	Type ↑↓	Location ↑↓	
<input type="checkbox"/>	az104-disk1	Disk	West Europe	...
<input type="checkbox"/>	az104-disk2	Disk	West Europe	...
<input type="checkbox"/>	az104-disk3	Disk	West Europe	...

Task 4: Deploy a template with the CLI

```
Bash
azureuser [ ~ ]$ cd lab3/
azureuser [ ~/lab3 ]$ nano template.json
azureuser [ ~/lab3 ]$ nano parameters.json
azureuser [ ~/lab3 ]$ az deployment group create --resource-group Lab3 --template-file template.json --parameters parameters.json
{
  "id": "/subscriptions/bcc92c21-80be-4af0-ab7b-38dc7d79ab16/resourceGroups/Lab3/providers/Microsoft.Resources/deployments/template",
  "location": null,
  "name": "template",
  "properties": {
    "correlationId": "4748c400-114d-4e73-a795-3666a5e9e68d",
    "debugSetting": null,
    "dependencies": []
  }
}


azureuser [ ~/lab3 ]$ az disk list --output table
Name                                     ResourceGroup  Location  Zones  Sku              OsType  SizeGb  ProvisioningState
-----
Ubuntu-22_disk1_964ef77eecf04185a84abf8be97f126b  JUST-VIRTUALKA  westeurope  StandardSSD_LRS  Linux    30      Succeeded
az104-disk1                                         LAB3            westeurope  Premium_LRS      32      Succeeded
az104-disk2                                         LAB3            westeurope  Premium_LRS      32      Succeeded
az104-disk3                                         LAB3            westeurope  Premium_LRS      32      Succeeded
az104-disk4                                         LAB3            westeurope  Premium_LRS      32      Succeeded
Windows-Server_OsDisk_1_5689f524c3c649cd97987b456dcde3e2  SERVER-WIN      eastus      Premium_LRS      Windows  64      Succeeded
azureuser [ ~/lab3 ]$
```

Task 5: Deploy a resource by using Azure Bicep

```
azureuser [ ~/lab3 ]$ az deployment group create --resource-group Lab3 --template-file azuredeploydisk.bicep
A new Bicep release is available: v0.30.23. Upgrade now by running "az bicep upgrade".
/home/azureuser/lab3/azuredeploydisk.bicep(2,7) : Warning no-unused-params: Parameter "managedDiskName" is declared but never used. [https://aka.ms/bicep/linter/no-unused-params]
/home/azureuser/lab3/azuredeploydisk.bicep(7,7) : Warning no-unused-params: Parameter "diskSizeinGiB" is declared but never used. [https://aka.ms/bicep/linter/no-unused-params]

{
  "id": "/subscriptions/bcc92c21-80be-4af0-ab7b-38dc7d79ab16/resourceGroups/Lab3/providers/Microsoft.Resources/deployments/azuredeploydisk",
  "location": null,
  "name": "azuredeploydisk",
  "properties": {
    "correlationId": "8400788d-520e-4bc8-9e63-3e92208e51ee",
    "debugSetting": null,
    "dependencies": [],
    "duration": "PT6.2860569S",
    "error": null,
    "mode": "Incremental"
  }
}
```

Home > Resource groups > Lab3 >

 **Disk4**

Disk

Disk state : Unattached

Storage type : Standard SSD LRS

Last ownership update time : -

Managed by : -

Location : West Europe

Operating system : -

Subscription (move) : [Azure for Students](#)

Max shares : 0

Subscription ID : bcc92c21-80be-4af0-ab7b-38dc7d79ab16

Availability zone : No infrastructure redundancy required

Overview

Activity log

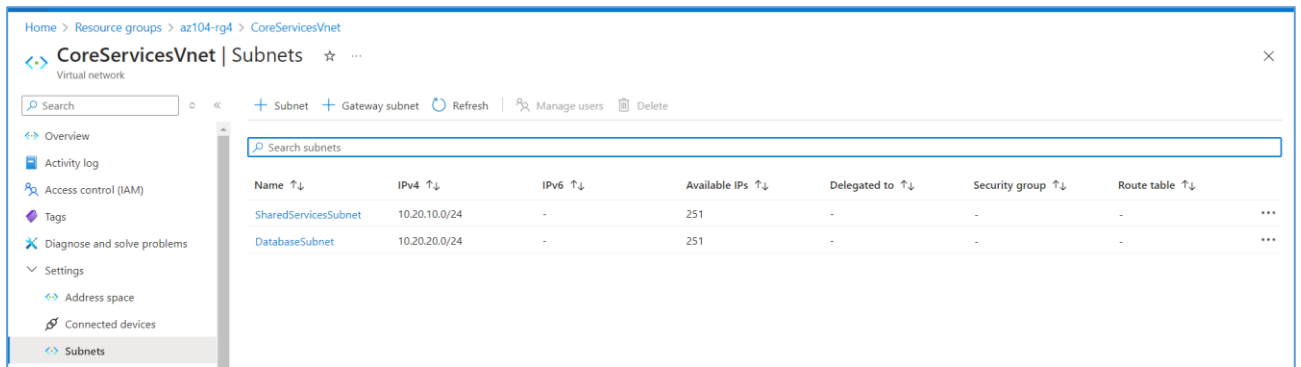
Access control (IAM)

Bash

```
azureuser [ ~/lab3 ]$ az disk list --output table
Name                                     ResourceGroup  Location  Zones  Sku              OsType  SizeGb  ProvisioningState
-----
Ubuntu-22_disk1_964ef77eecf04185a84abf8be97f126b  JUST-VIRTUALKA  westeurope  StandardSSD_LRS  Linux    30      Succeeded
az104-disk1                                         LAB3            westeurope  Premium_LRS      32      Succeeded
az104-disk2                                         LAB3            westeurope  Premium_LRS      32      Succeeded
az104-disk3                                         LAB3            westeurope  Premium_LRS      32      Succeeded
az104-disk4                                         LAB3            westeurope  Premium_LRS      32      Succeeded
Disk4                                              LAB3            westeurope  StandardSSD_LRS  32      Succeeded
Windows-Server_OsDisk_1_5689f524c3c649cd97987b456dcde3e2  SERVER-WIN      eastus      Premium_LRS      Windows  64      Succeeded
azureuser [ ~/lab3 ]$
```

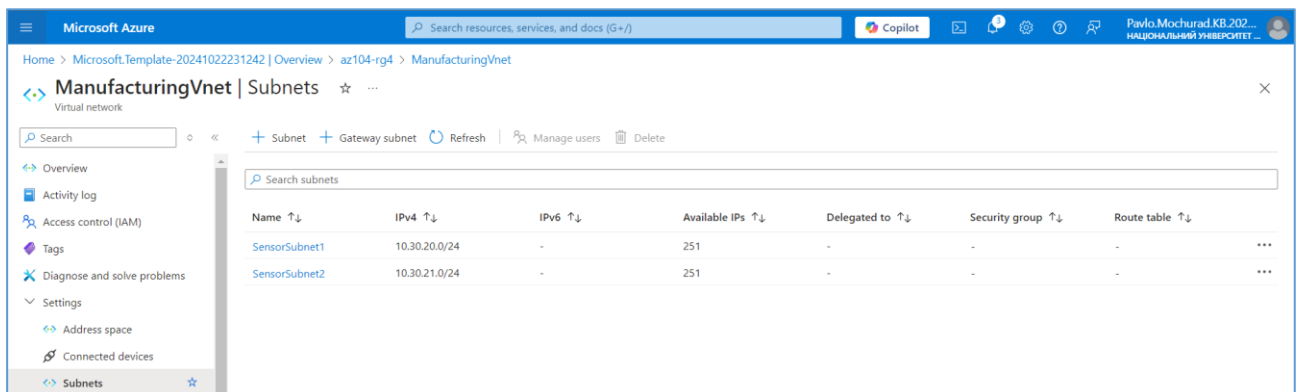
Lab 04 - Implement Virtual Networking

Task 1: Create a virtual network with subnets using the portal

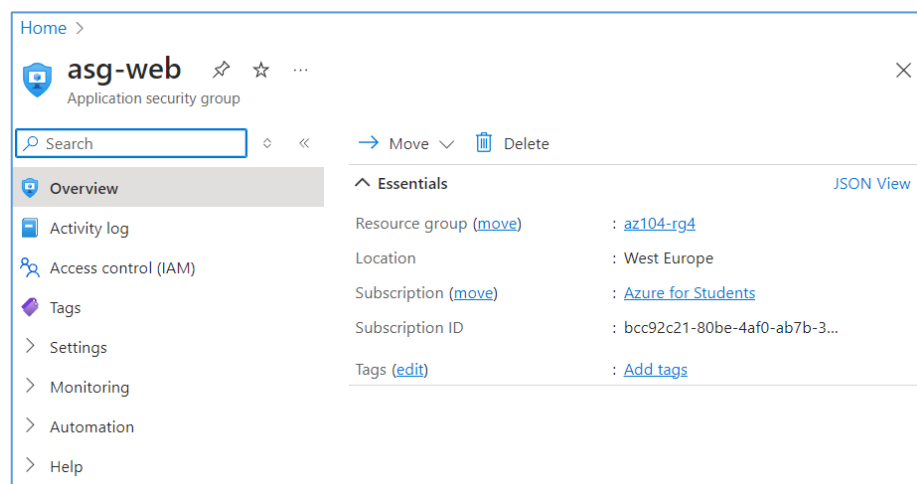


Task 2: Create a virtual network and subnets using a template.

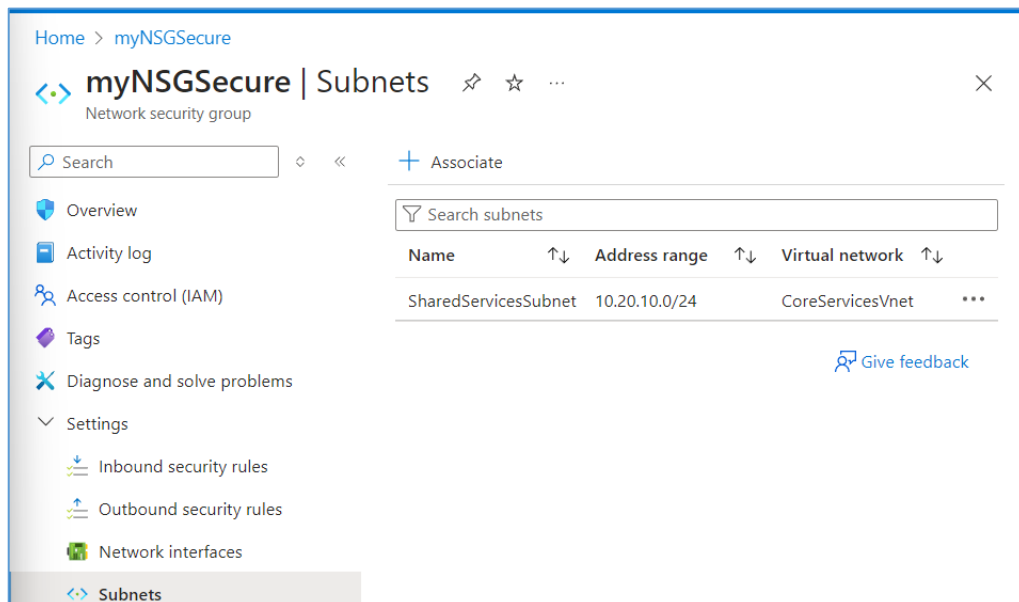
I used the arm template from a previous task where I deployed resources manually. But I changed the v-net name, subnet, and address space fields.



Task 3: Create and configure communication between an Application Security Group and a Network Security Group.



Application security group



Network Security group with associate subnet

+ Add Hide default rules Refresh Delete Give feedback						
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 == all Protocol == all Source == all Destination == all Action == all						
Priority ↑↓	Name ↑↓	Port ↑↓	Protocol ↑↓	Source ↑↓	Destination ↑↓	Action ↑↓
<input type="checkbox"/> 100	AllowASG	80,443	TCP	asg-web	Any	✓ Allow Delete
<input type="checkbox"/> 65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	✓ Allow Delete
<input type="checkbox"/> 65001	AllowAzureLoadBalancer...	Any	Any	AzureLoadBalancer	Any	✓ Allow Delete
<input type="checkbox"/> 65500	DenyAllInBound	Any	Any	Any	Any	✗ Deny Delete

Inbound rules

Outbound security rules ☆ ...						
+ Add Hide default rules Refresh Delete Give feedback						
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 == all Protocol == all Source == all Destination == all Action == all						
Priority ↑↓	Name ↑↓	Port ↑↓	Protocol ↑↓	Source ↑↓	Destination ↑↓	Action ↑↓
<input type="checkbox"/> 4096	DenyAnyCustom8080Out...	8080	Any	Any	Internet	✗ Deny Delete
<input type="checkbox"/> 65000	AllowVnetOutBound	Any	Any	VirtualNetwork	VirtualNetwork	✓ Allow Delete
<input type="checkbox"/> 65001	AllowInternetOutBound	Any	Any	Any	Internet	✓ Allow Delete
<input type="checkbox"/> 65500	DenyAllOutBound	Any	Any	Any	Any	✗ Deny Delete

Outbound rules

Task 4: Configure public and private Azure DNS zones

Configure a public DNS zone

The screenshot shows the Microsoft Azure portal interface for the public DNS zone **contosolab4.com**. The left sidebar contains navigation options: Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings, DNS Management, Recordsets (selected), Monitoring, Automation, and Help. The main content area displays a table of record sets. The table has columns: Name, Type, TTL, Value, Alias resource type, and Alias target. Three record sets are listed: NS, SOA, and A. The A record set for **www** has a value of **10.1.1.4**, which is circled in red.

Name	Type	TTL	Value	Alias resource type	Alias target
@	NS	172800	ns1-09.azure-dns.com. ns2-09.azure-dns.net. ns3-09.azure-dns.org. ns4-09.azure-dns.info.		
@	SOA	3600	Email: azure-dns-hostmaster.microsoft.com Host: ns1-09.azure-dns.com. Refresh: 3600 Retry: 300 Expire: 2419200 Minimum TTL: 300 Serial number: 1		
www	A	3600	10.1.1.4		

```
PS C:\Users\mothu\Downloads\ExportedTemplate-az104-rg4> nslookup www.contosolab4.com ns1-09.azure-dns.com
Server:      UnKnown
Address:     13.107.236.9

Name:   www.contosolab4.com
Address: 10.1.1.4

PS C:\Users\mothu\Downloads\ExportedTemplate-az104-rg4>
```

Configure a private DNS zone

The screenshot shows the Microsoft Azure portal interface for the private DNS zone **private.contosolab4.com**. The left sidebar contains navigation options: Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings, Properties, Locks, DNS Management, Recordsets (selected), and Virtual Network Links. The main content area displays a table of record sets. The table has columns: Name, Type, TTL, Value, and Auto registered. Two record sets are listed: A and SOA. The A record set for **sensorvm** has a value of **10.1.1.4**. A notification banner at the top right states: "Create record set. Successfully created record set 'sensorvm'".

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	False



Search

+ Add Refresh Delete

- Overview
- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems
- Settings
- Properties

Search virtual network links

0 Virtual Network links selected

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