Project: Azure High Availability & Resilience Infrastructure Deployment

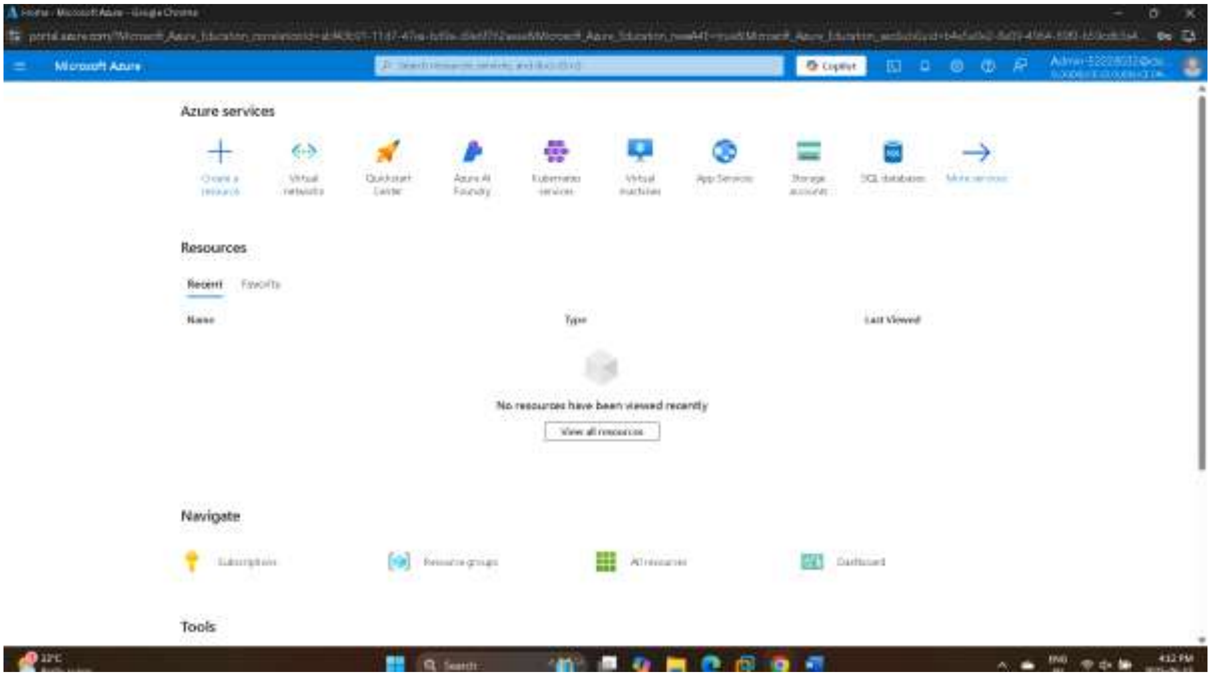
Task01	Implement Azure Virtual Networking
Task02	Implement an Azure Load Balancer
Task03	Use Azure Storage Explorer
Task04	Enable Azure Virtual Machine Scale Sets for High Availability and Scalability
Task05	Enable VM Backup by Using Recovery Services Vault

-

Task 01: Implement Azure Virtual Networking

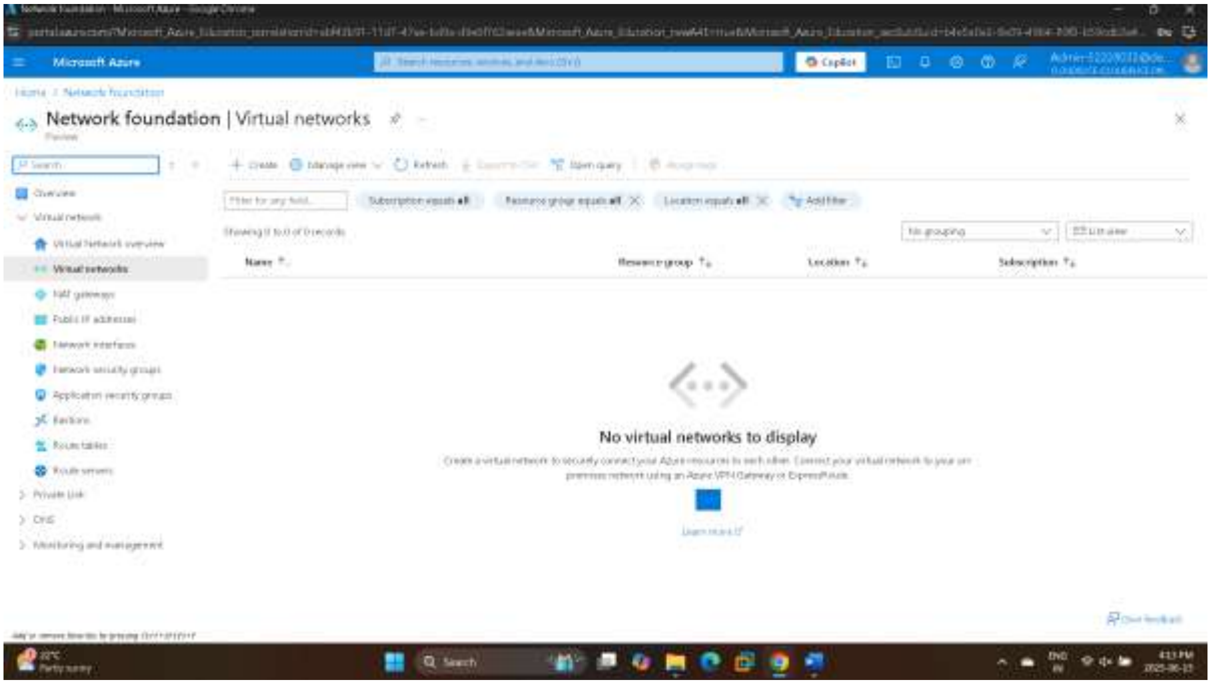
- Create an Azure virtual network by using the Azure portal

On the Azure portal home page, in Azure services, select Create a resource.



No resources have been viewed recently

In the Azure marketplace, search for and select Virtual Network, and then select the Virtual network tile.

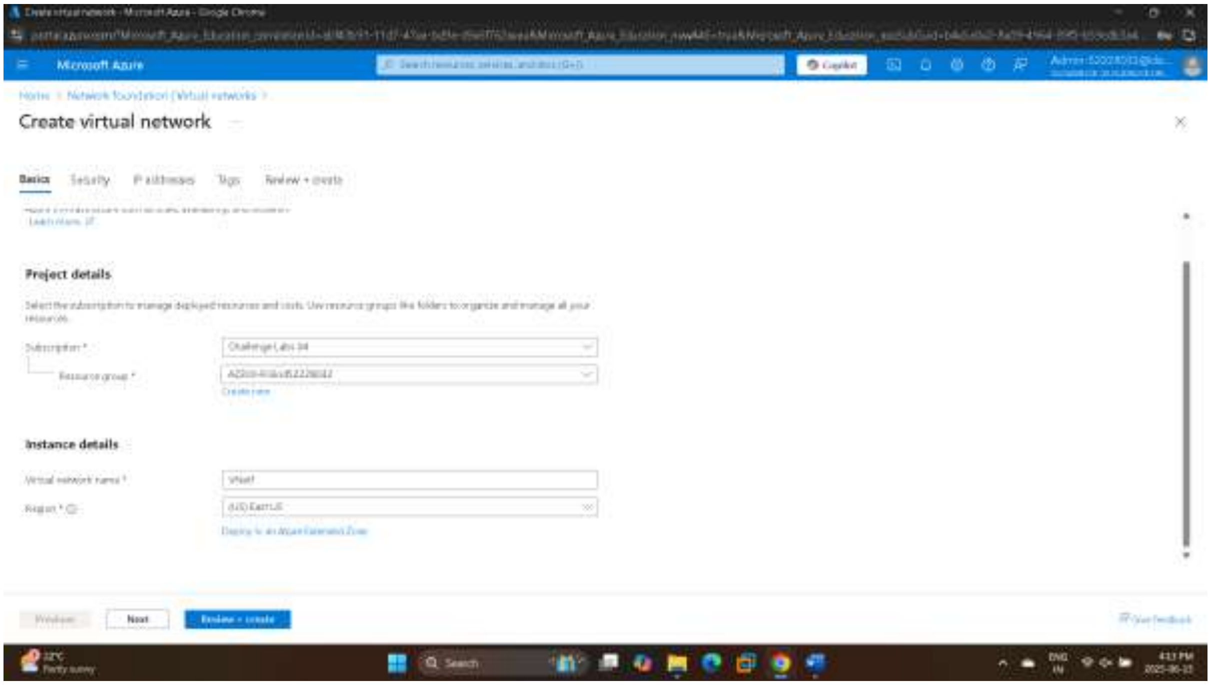


Network foundation | Virtual networks

No virtual networks to display

On the Virtual Network blade, review the information, and then select Create.
On the Create virtual network blade, on the Basics page, in Project details, in Resource group, select AZ300-RGlod52228032.

In Instance details, in Virtual network name, enter VNet1.
In Region, select (US) East US 2, and then select IP addresses tab.



Create virtual network

Project details

Subscription * Challenge Labs 34

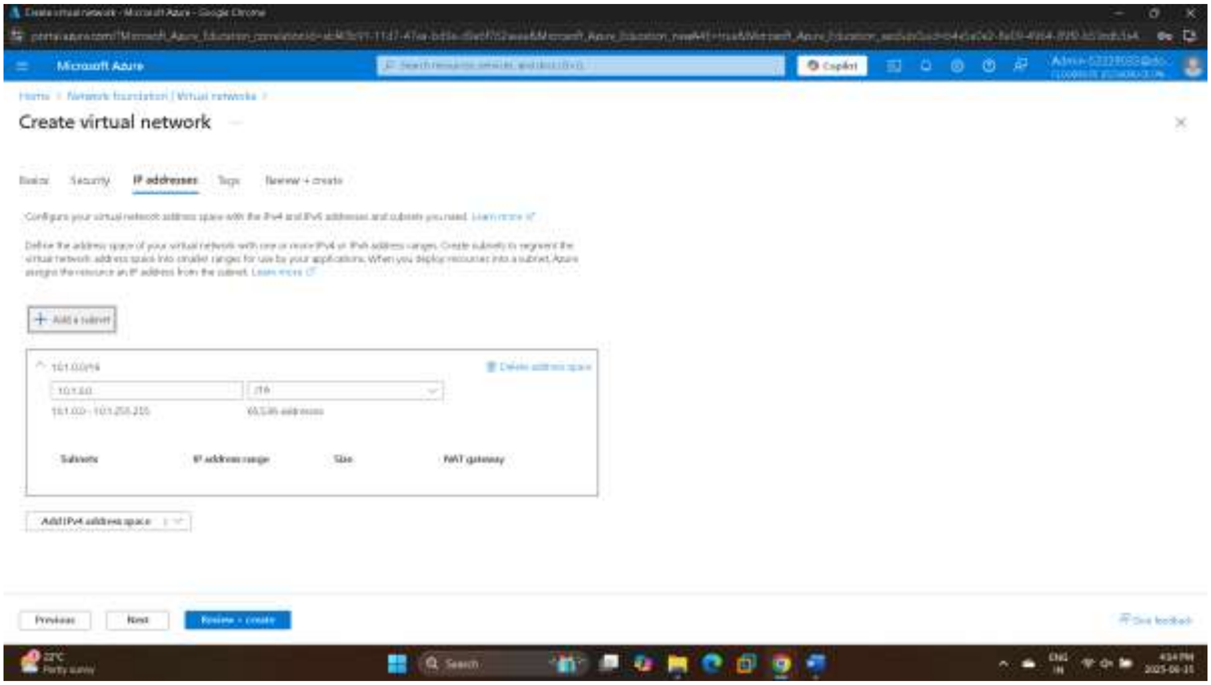
Resource group * AZ300-RGlod52228032

Instance details

Virtual network name * VNet1

Region * (US) East US

In the existing address space tile, change the address prefix to 10.1.0.0, and then in the Address space size, ensure that /16 is selected.
Delete the default subnet.



Create virtual network

Basics | Security | IP addresses | Tags | Review + create

Configure your virtual network address space with the IPv4 and IPv6 addresses and subnets you need. Learn more

Define the address space of your virtual network with one or more IPv4 or IPv6 address ranges. Create subnets to segment the virtual network address space into smaller ranges for use by your applications. When you deploy resources into a subnet, Azure assigns the resource an IP address from the subnet. Learn more

10.1.0.0/16

10.1.0.0 | /16

10.1.0.0 - 10.1.255.255 | 65,536 addresses

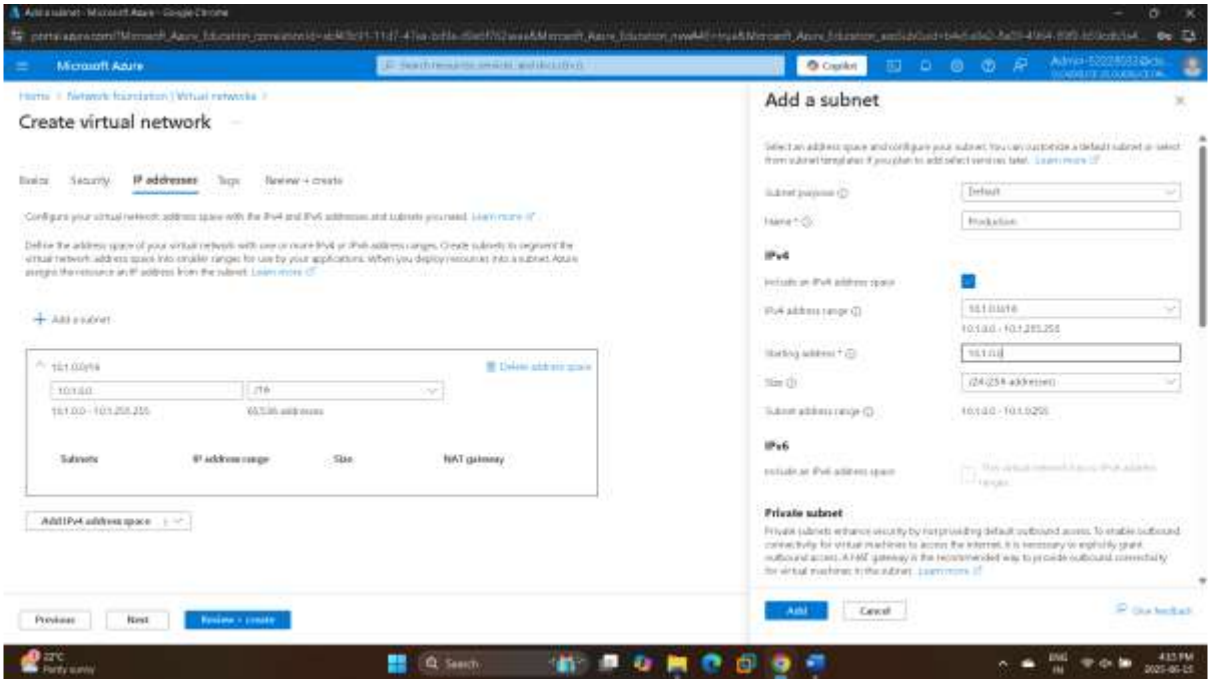
Subnets | IP address range | Size | NAT gateway

Select Add a subnet.

On the Add a subnet blade, in Name, enter Production.

In IPv4, in Starting address, ensure that 10.1.0.0 is selected, and then in Size, ensure that /24 is selected.

Select Add.



Add a subnet

Select an address space and configure your subnet. You can customize a default subnet or select from subnet templates if you plan to add select services later. Learn more

Subnet purpose: Default

Name *: Production

IPv4

Include an IPv4 address space: ☑

IPv4 address range: 10.1.0.0/16

10.1.0.0 - 10.1.255.255

Starting address *: 10.1.0.0

Size: /24 (256 addresses)

Subnet address range: 10.1.0.0 - 10.1.0.255

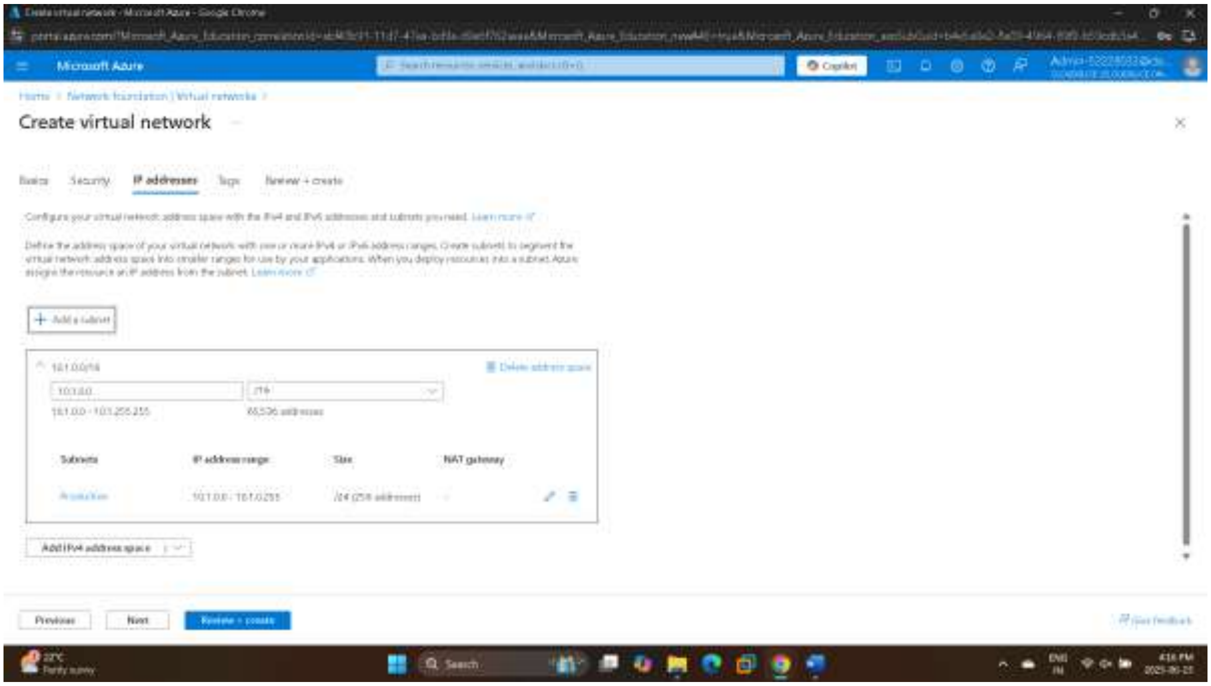
IPv6

Include an IPv6 address space: □ This virtual network has no IPv6 address ranges.

Private subnet

Private subnets enhance security by not providing default outbound access. To enable outbound connectivity for virtual machines to access the internet, it is necessary to explicitly grant outbound access. A NAT gateway is the recommended way to provide outbound connectivity for virtual machines in the subnet. Learn more

On the Create virtual network blade, select Review + create.



Create virtual network

Basics | Security | **IP addresses** | Tags | Review + create

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Define the address space of your virtual network with one or more IPv4 or IPv6 address ranges. Create subnets to segment the virtual network address space into smaller ranges for use by your applications. When you deploy resources into a subnet, Azure assigns the resource an IP address from the subnet. Learn more

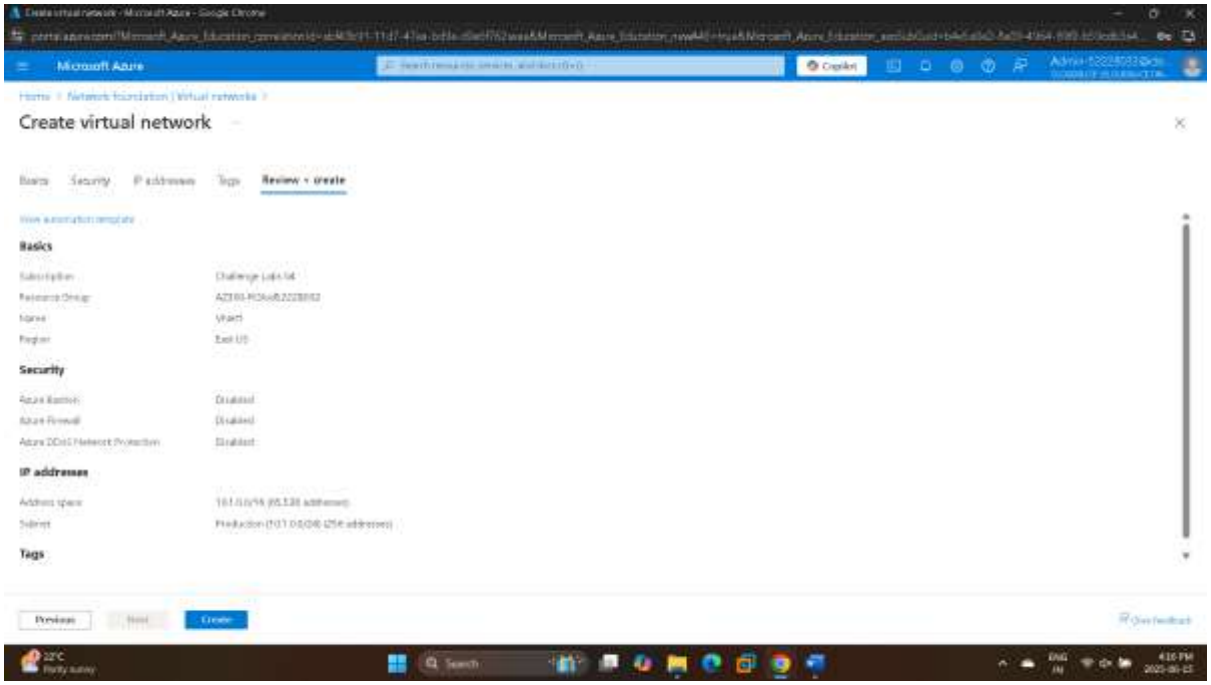
10.1.0.0/16

10.1.0.0 /16

10.1.0.0 - 10.1.255.255 65,536 addresses

Subnets	IP address range	Size	NAT gateway
Production	10.1.0.0 - 10.1.0.255	/24 (256 addresses)	-

Review the configuration, and then select Create.



Create virtual network

Basics | Security | IP addresses | Tags | **Review + create**

View automation template

Basics

Subscription	Challenge Labs [illegible]
Resource Group	AZ100-[illegible]
Name	VNet1
Region	East US

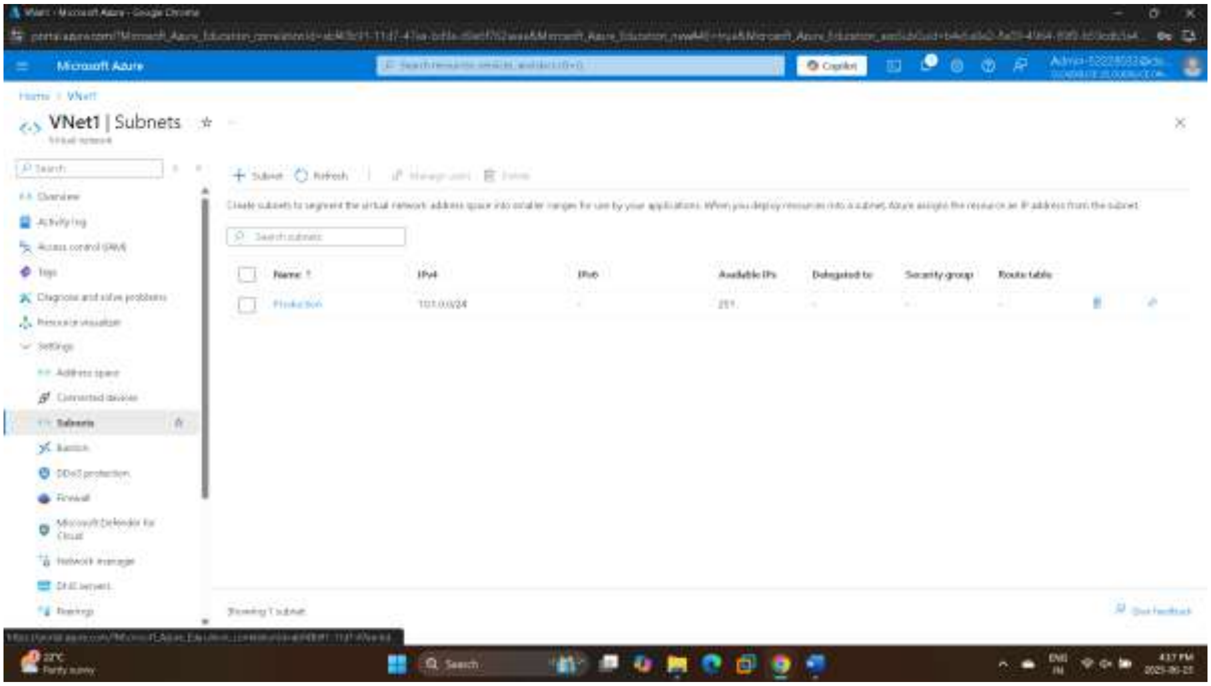
Security

Azure Bastion	Disabled
Azure Firewall	Disabled
Azure DDoS Network Protection	Disabled

IP addresses

Address space	10.1.0.0/16 (65,536 addresses)
Subnet	Production (10.1.0.0/24) (256 addresses)

Tags



VNet1 | Subnets

Virtual network

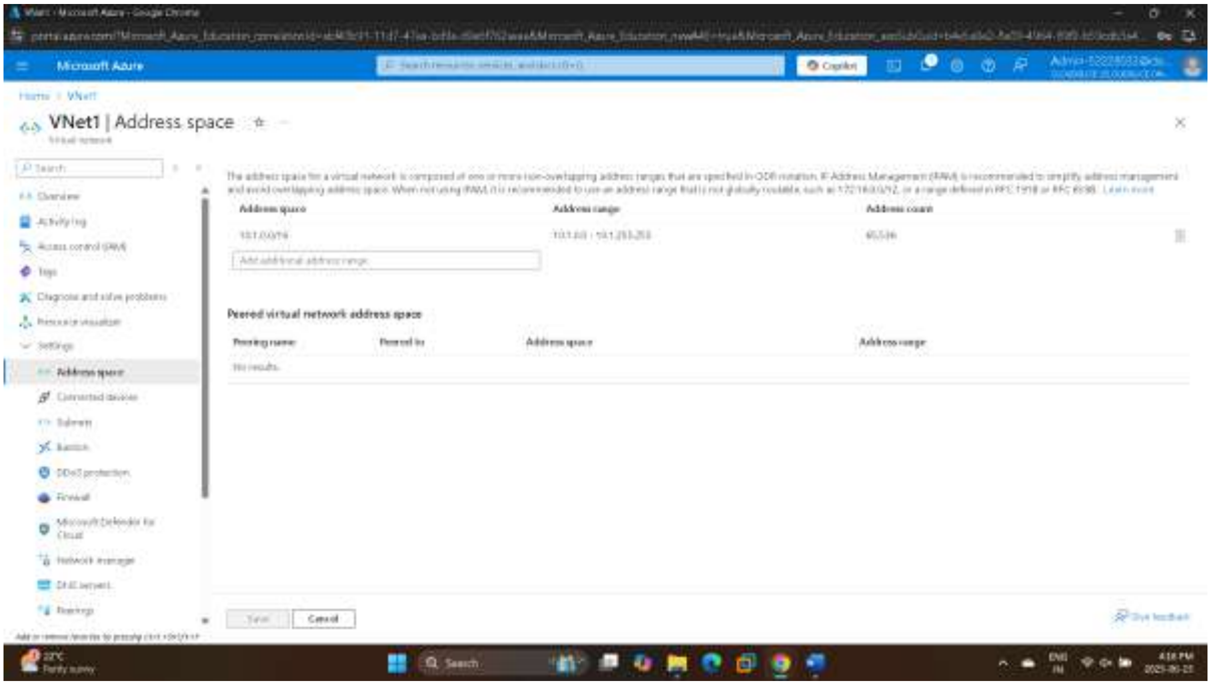
Create subnets to segment the virtual network address space into smaller ranges for use by your applications. When you deploy resources into a subnet, Azure assigns the resource an IP address from the subnet.

Name ↑	IPv4	IPv6	Available IPs	Delegated to	Security group	Route table
Production	10.1.0.0/24	-	251	-	-	-

Showing 1 subnet

Add the 172.16.0.0/16 Subnet address range to VNet1.

On the Deployment blade, select Go to resource.
On the VNet1 service menu, in Settings, select Address space.



VNet1 | Address space

Virtual network

The address space for a virtual network is composed of one or more non-overlapping address ranges that are specified in CIDR notation. IP Address Management (IPAM) is recommended to simplify address management and avoid overlapping address space. When not using IPAM, it is recommended to use an address range that is not globally routable, such as 172.16.0.0/12, or a range defined in RFC 1918 or RFC 6598. Learn more

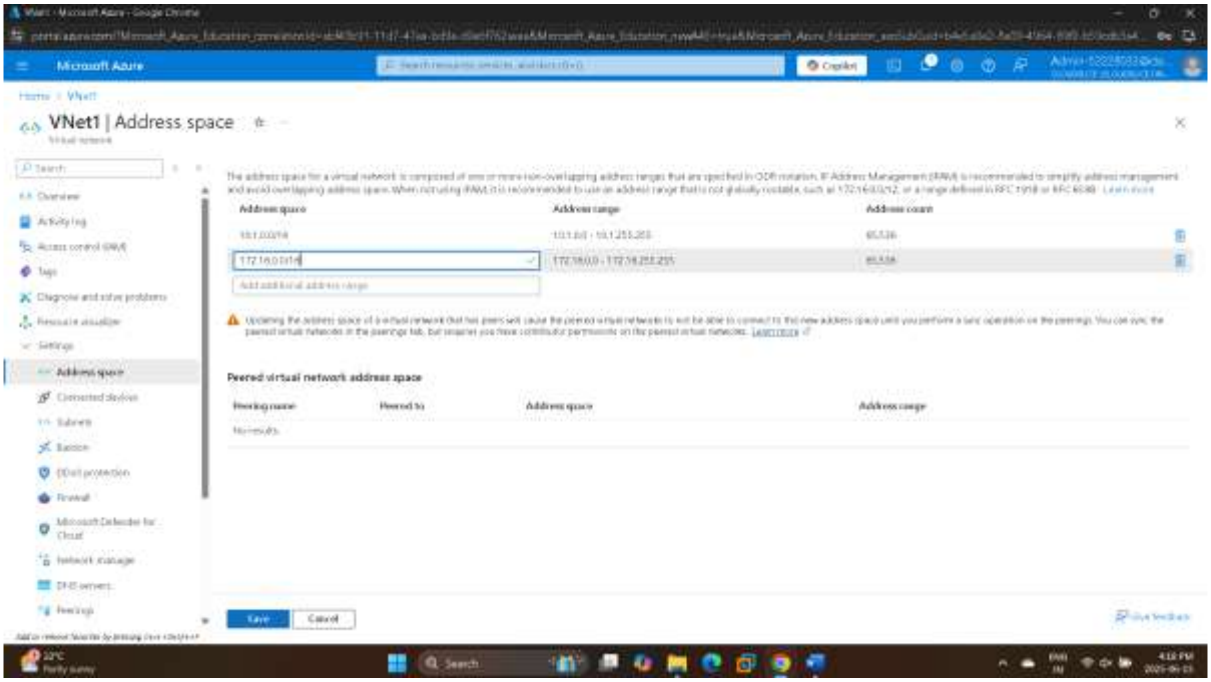
Address space	Address range	Address count
10.1.0.0/16	10.1.0.0 - 10.1.255.255	65536

Add additional address range

Peered virtual network address space

Peering name	Peered to	Address space	Address range
No results.			

In Add additional Subnet address range, enter 172.16.0.0/16, and then select Save.



VNet1 | Address space

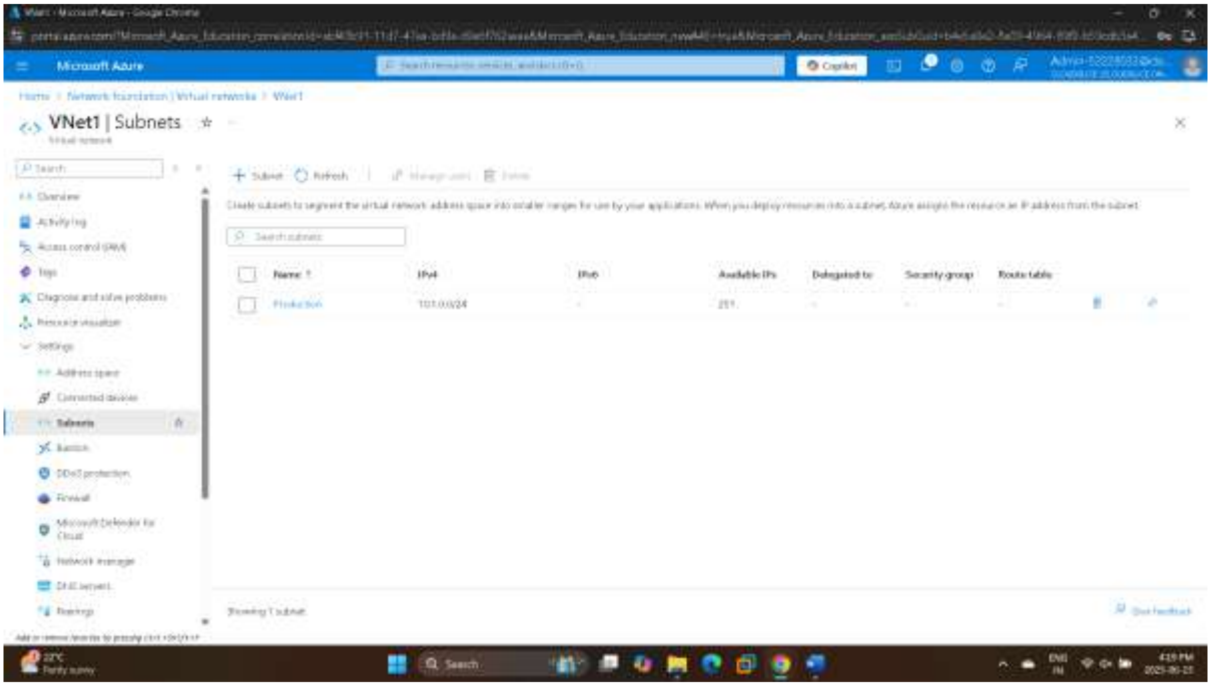
Address space	Address range	Address count
10.1.0.0/16	10.1.0.0 - 10.1.255.255	65,536
172.16.0.0/16	172.16.0.0 - 172.16.255.255	65,536

Peered virtual network address space

Peering name	Peered to	Address space	Address range
No results.			

Add a subnet named Development to the VNet1 VNet that has a Subnet address range of 172.16.1.0/24.

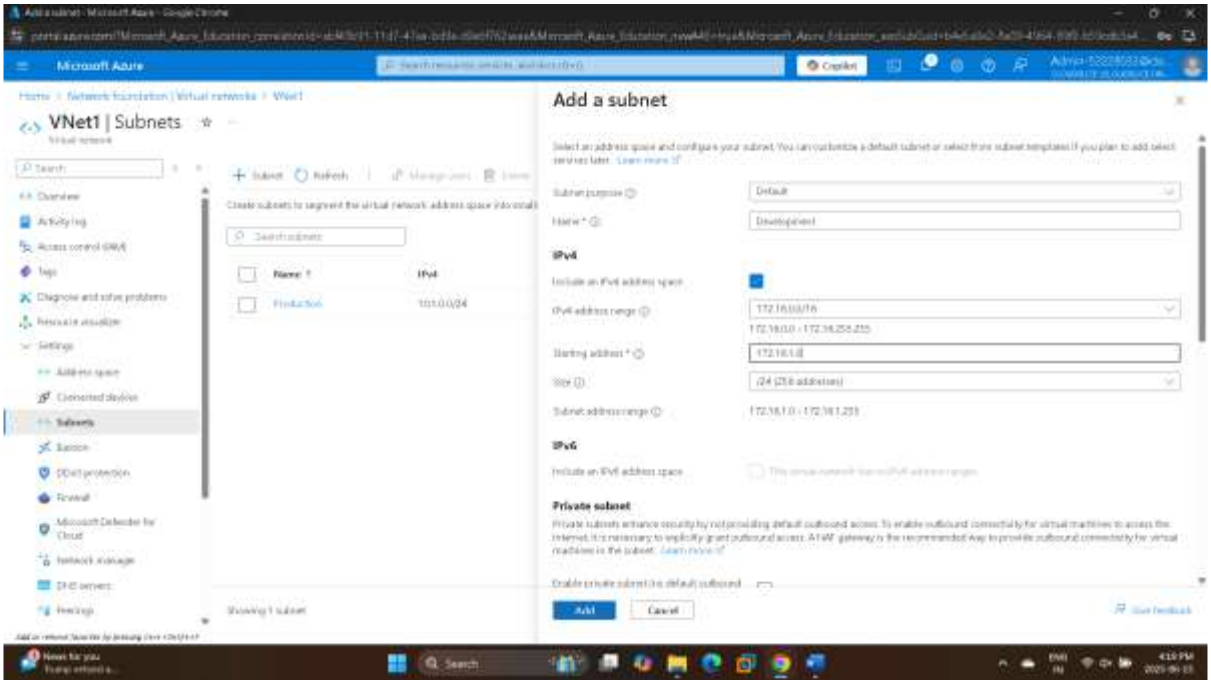
On the VNet1 service menu, in Settings, select Subnets.
On the Subnets page, on the Command bar, select +Subnet.



VNet1 | Subnets

Name ↑	IPv4	IPv6	Available IPs	Delegated to	Security group	Route table
Production	10.1.0.0/24	-	251	-	-	-

On the Add a subnet blade, in Name, enter Development.
In IPv4Subnet address range, select 172.16.0.0 - 172.16.255.255.
In Starting address, enter 172.16.1.0, ensure that Size is set to /24 (256 addresses), and then select Add.



Create subnets to segment the virtual network address space into small

	Name ↑	IPv4
□	Production	10.1.0.0/24

Add a subnet

Select an address space and configure your subnet. You can customize a default subnet or select from subnet templates if you plan to add select services later. Learn more

Subnet purpose ⓘ: Default

Name * ⓘ: Development

IPv4

Include an IPv4 address space: ☑

IPv4 address range ⓘ: 172.16.0.0/16

172.16.0.0 - 172.16.255.255

Starting address * ⓘ: 172.16.1.0

Size ⓘ: /24 (256 addresses)

Subnet address range ⓘ: 172.16.1.0 - 172.16.1.255

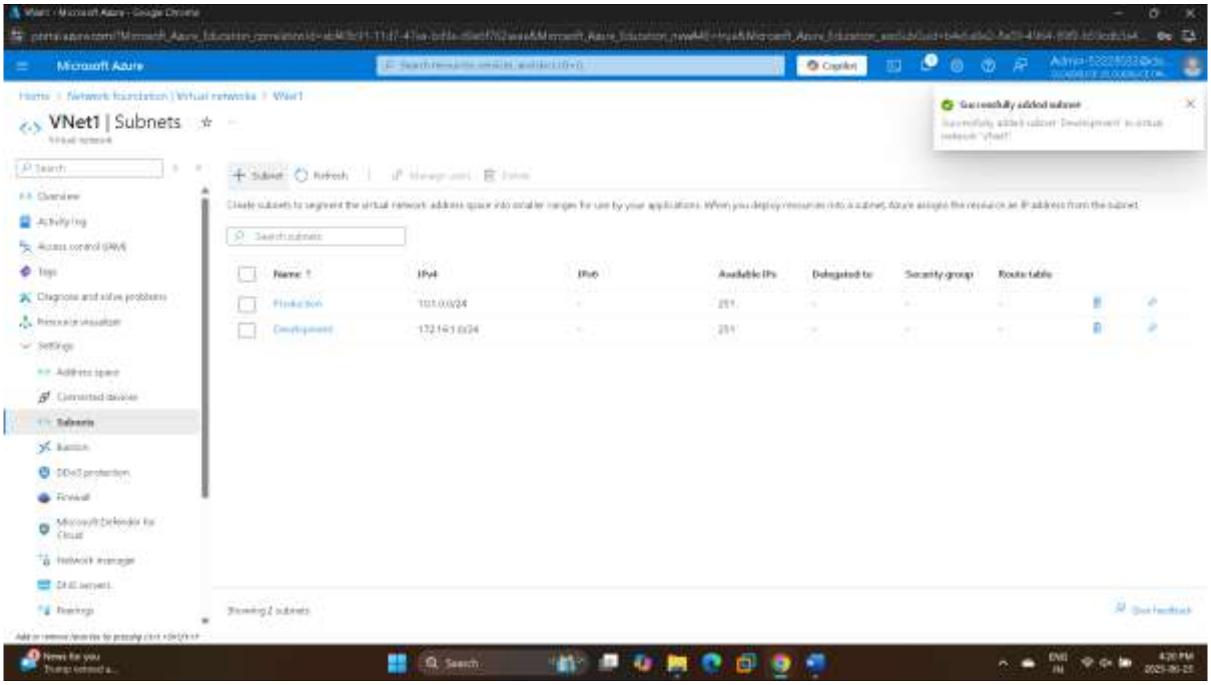
IPv6

Include an IPv6 address space: □ This virtual network has no IPv6 address ranges

Private subnet

Private subnets enhance security by not providing default outbound access. To enable outbound connectivity for virtual machines to access the internet, it's necessary to explicitly grant outbound access. A NAT gateway is the recommended way to provide outbound connectivity for virtual machines in the subnet. Learn more

Enable private subnet (no default outbound access) □

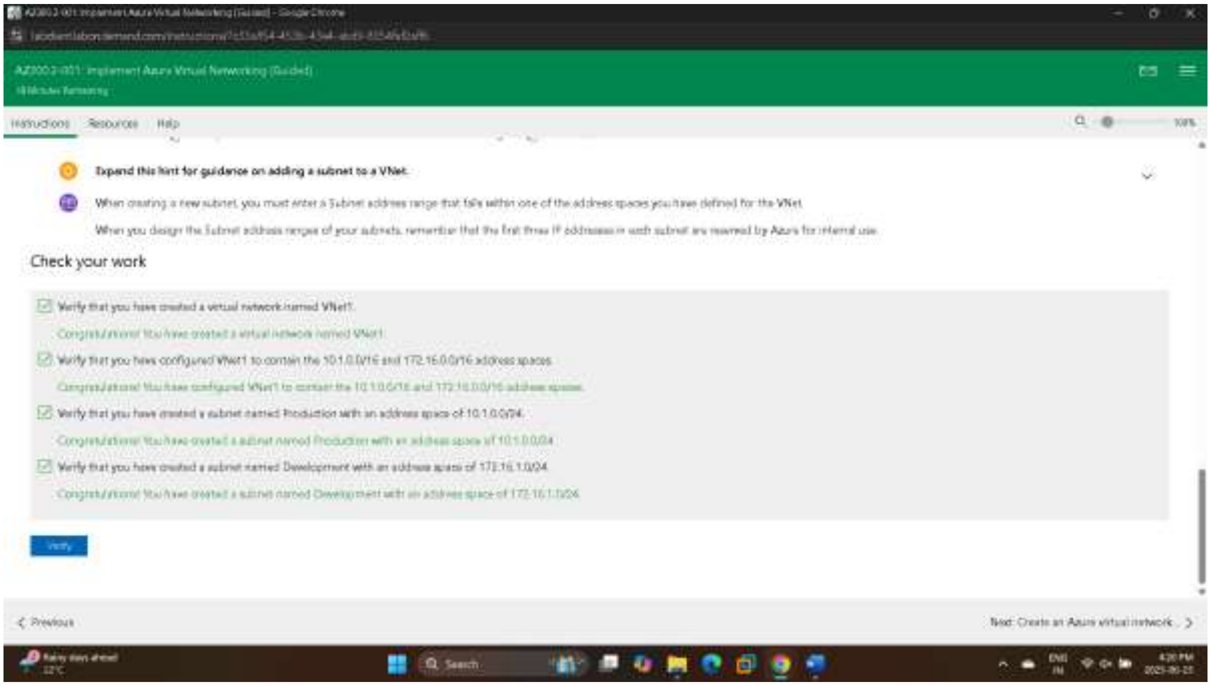


Successfully added subnet

Successfully added subnet 'Development' to virtual network 'VNet1'.

Create subnets to segment the virtual network address space into smaller ranges for use by your applications. When you deploy resources into a subnet, Azure assigns the resource an IP address from the subnet.

	Name ↑	IPv4	IPv6	Available IPs	Delegated to	Security group	Route table
□	Production	10.1.0.0/24	-	251	-	-	-
□	Development	172.16.1.0/24	-	251	-	-	-



AZ002-001: Implement Azure Virtual Networking (Guided)

Expand this hint for guidance on adding a subnet to a VNet.

When creating a new subnet, you must enter a Subnet address range that falls within one of the address spaces you have defined for the VNet.

When you design the Subnet address ranges of your subnets, remember that the first three IP addresses in each subnet are reserved by Azure for internal use.

Check your work

☑ Verify that you have created a virtual network named VNet1.

Congratulations! You have created a virtual network named VNet1.

☑ Verify that you have configured VNet1 to contain the 10.1.0.0/16 and 172.16.0.0/16 address spaces.

Congratulations! You have configured VNet1 to contain the 10.1.0.0/16 and 172.16.0.0/16 address spaces.

☑ Verify that you have created a subnet named Production with an address space of 10.1.0.0/24.

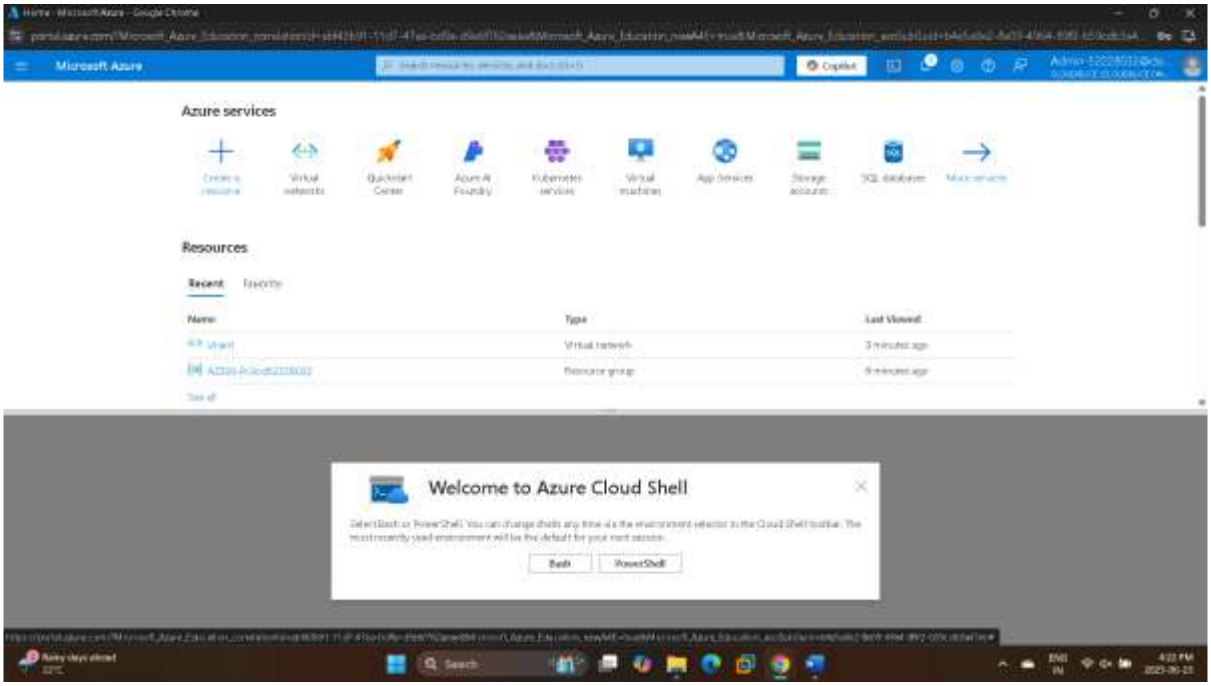
Congratulations! You have created a subnet named Production with an address space of 10.1.0.0/24.

☑ Verify that you have created a subnet named Development with an address space of 172.16.1.0/24.

Congratulations! You have created a subnet named Development with an address space of 172.16.1.0/24.

- Create an Azure virtual network by using Azure PowerShell

On the Azure portal toolbar, in the global controls, select the Cloud Shell icon.
In the Welcome to Azure Cloud Shell dialog, select PowerShell.

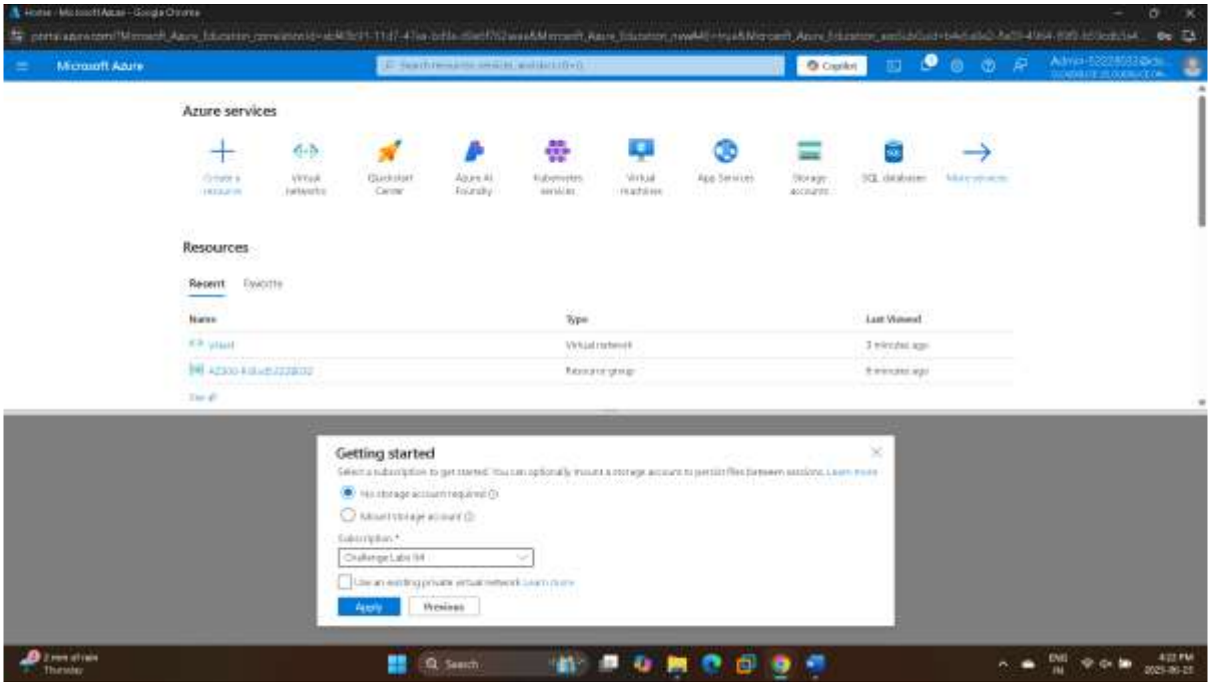


Welcome to Azure Cloud Shell

Select Bash or PowerShell. You can change shells any time via the environment selector in the Cloud Shell toolbar. The most recently used environment will be the default for your next session.

Name	Type	Last Viewed
VNet1	Virtual network	3 minutes ago
AZ[illegible]	Resource group	9 minutes ago

In the Getting started dialog, select No storage account required, in Subscription, select the existing Challenge Labs option, and then select Apply.



Name	Type	Last Viewed
vnet	Virtual network	3 minutes ago
AZ300-RGlod52228032	Resource group	8 minutes ago

Getting started

Select a subscription to get started. You can optionally mount a storage account to persist files between sessions. Learn more

● No storage account required ⓘ

○ Mount storage account ⓘ

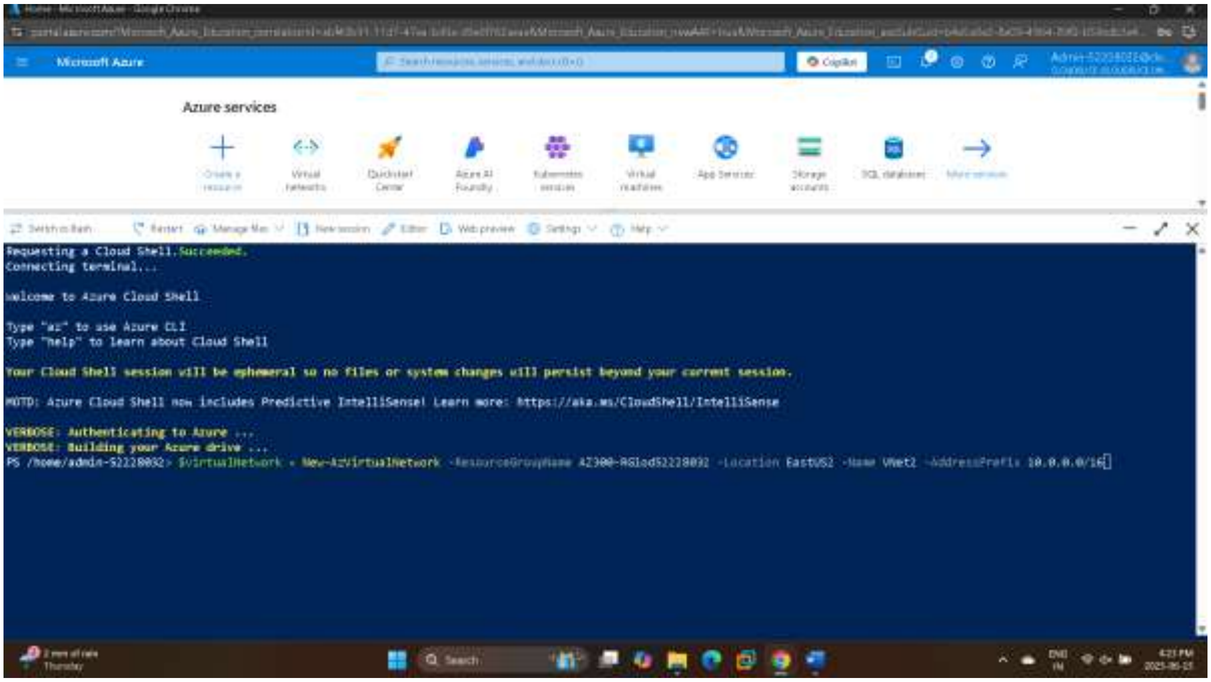
Subscription *

Challenge Labs 04

□ Use an existing private virtual network Learn more

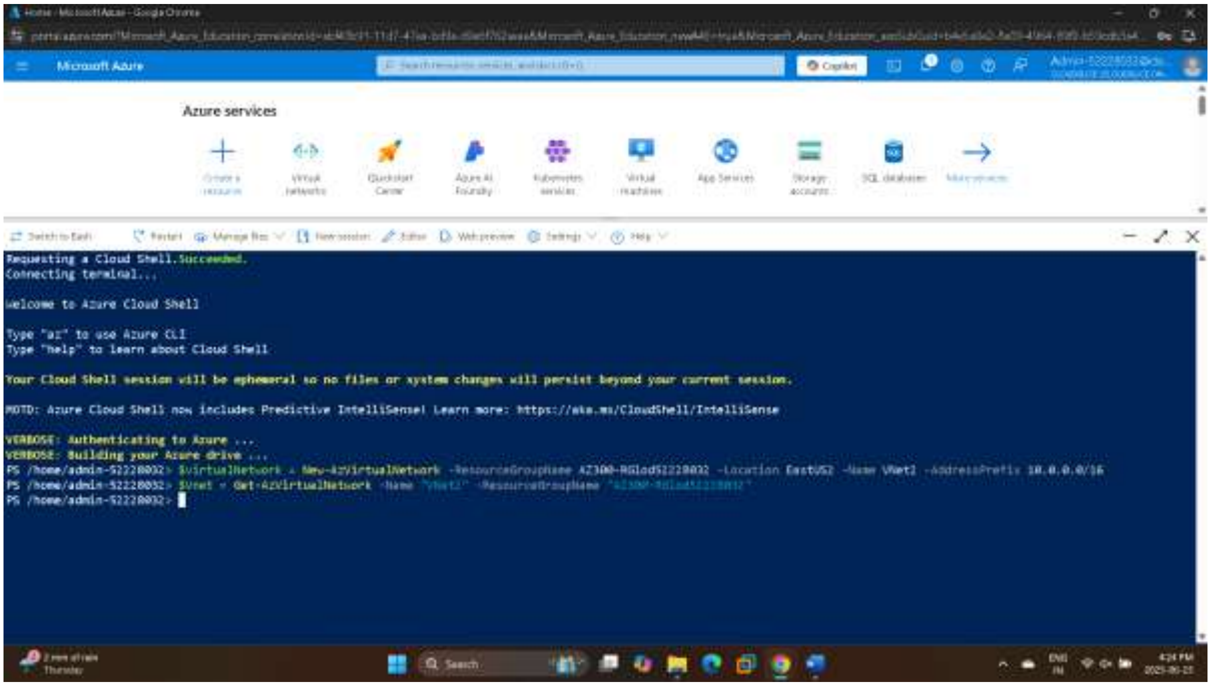
Create a VNet named VNet2 in the AZ300-RGlod52228032 resource group by using the New-AzVirtualNetwork cmdlet, the EastUS2 region, and the address prefix 10.0.0.0/16.

Run the following command to create a VNet:



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

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

Your Cloud Shell session will be ephemeral so no files or system changes will persist beyond your current session.

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/admin-52228032> $virtualNetwork = New-AzVirtualNetwork -ResourceGroupName AZ300-RGlod52228032 -Location EastUS2 -Name VNet2 -AddressPrefix 10.0.0.0/16
```

Run the following command to define a variable that holds the value of the VNet2 VNet:



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

Welcome to Azure Cloud Shell

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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/admin-52228032> $virtualNetwork = New-AzVirtualNetwork -ResourceGroupName AZ300-RGlod52228032 -Location EastUS2 -Name VNet2 -AddressPrefix 10.0.0.0/16
PS /home/admin-52228032> $Vnet = Get-AzVirtualNetwork -Name "VNet2" -ResourceGroupName "AZ300-RGlod52228032"
PS /home/admin-52228032> 
```
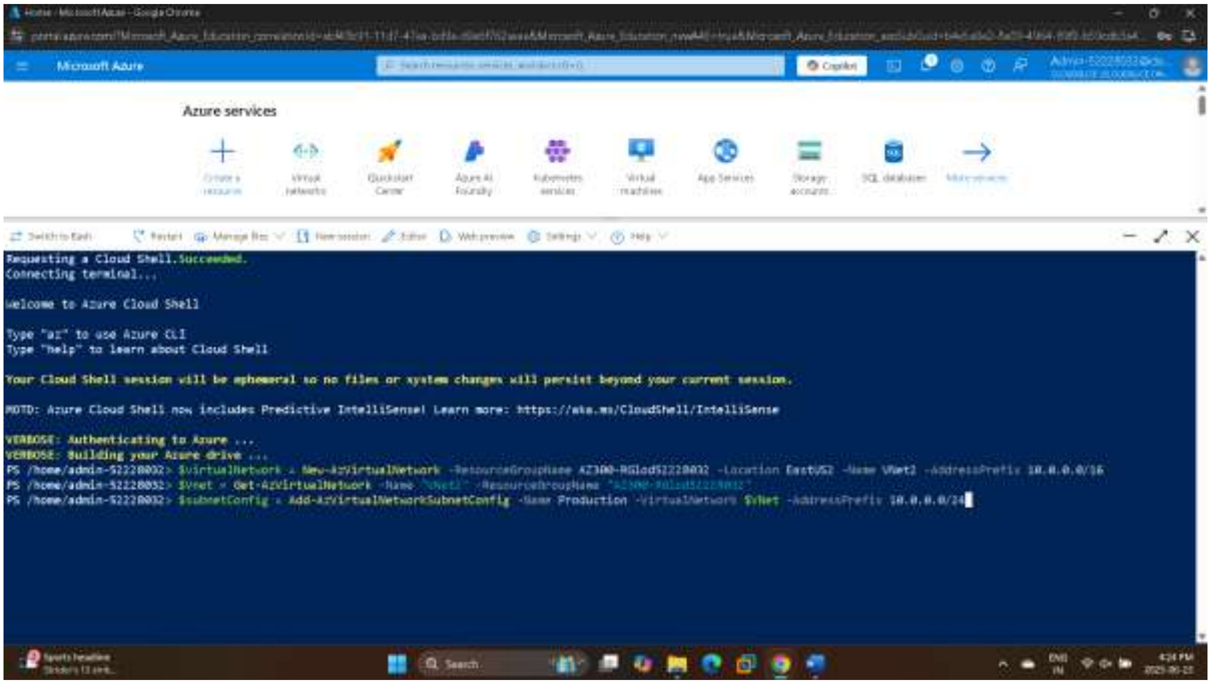

Add a subnet named Production in VNet2 by using the Add-AzVirtualNetworkSubnetConfig cmdlet and the $Vnet variable, assign an address prefix of 10.0.0.0/24, and then store the value in a variable named $subnetConfig.



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

Welcome to Azure Cloud Shell

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VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/admin-52228032> $virtualNetwork = New-AzVirtualNetwork -ResourceGroupName AZ300-RGlod52228032 -Location EastUS2 -Name VNet2 -AddressPrefix 10.0.0.0/16
PS /home/admin-52228032> $Vnet = Get-AzVirtualNetwork -Name "VNet2" -ResourceGroupName "AZ300-RGlod52228032"
PS /home/admin-52228032> $subnetConfig = Add-AzVirtualNetworkSubnetConfig -Name Production -VirtualNetwork $VNet -AddressPrefix 10.0.0.0/24
```
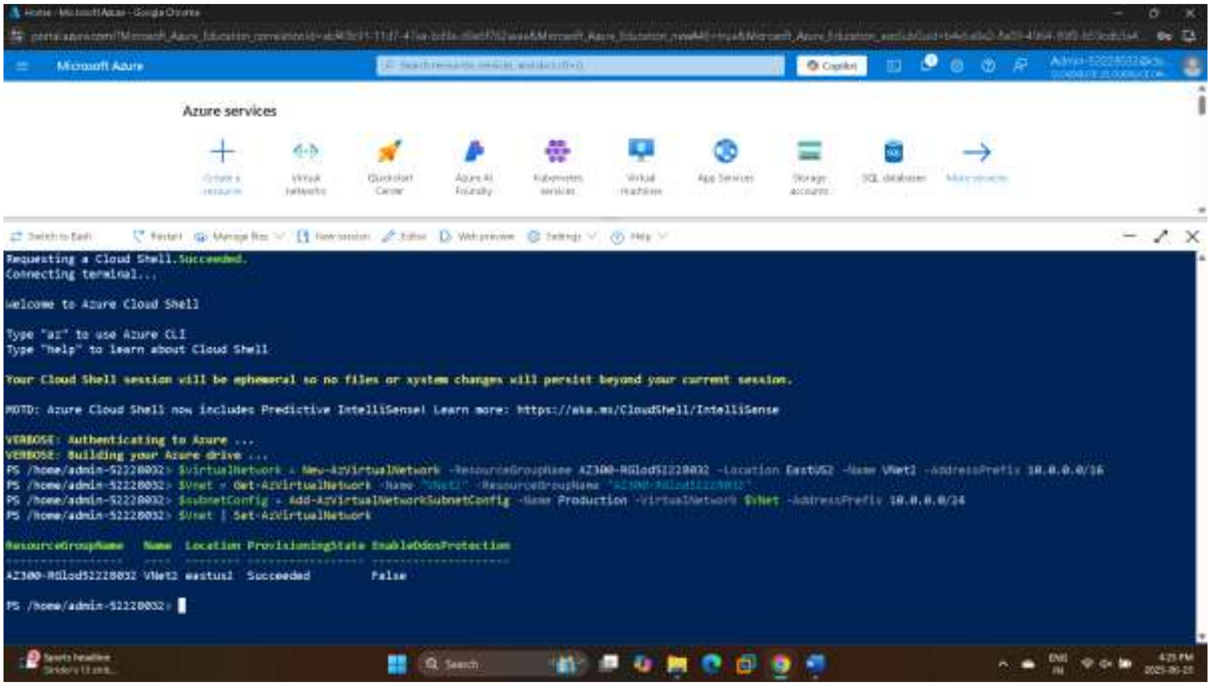

Write the subnet configuration to VNet2 by using the Set-AzVirtualNetwork cmdlet and the $Vnet variable.



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

Welcome to Azure Cloud Shell

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VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/admin-52228032> $virtualNetwork = New-AzVirtualNetwork -ResourceGroupName AZ300-RGlod52228032 -Location EastUS2 -Name VNet2 -AddressPrefix 10.0.0.0/16
PS /home/admin-52228032> $Vnet = Get-AzVirtualNetwork -Name "VNet2" -ResourceGroupName "AZ300-RGlod52228032"
PS /home/admin-52228032> $subnetConfig = Add-AzVirtualNetworkSubnetConfig -Name Production -VirtualNetwork $VNet -AddressPrefix 10.0.0.0/24
PS /home/admin-52228032> $Vnet | Set-AzVirtualNetwork

ResourceGroupName   Name  Location ProvisioningState EnableDdosProtection
-----------------   ----  -------- ----------------- --------------------
AZ300-RGlod52228032 VNet2 eastus2  Succeeded         False

PS /home/admin-52228032> 
```
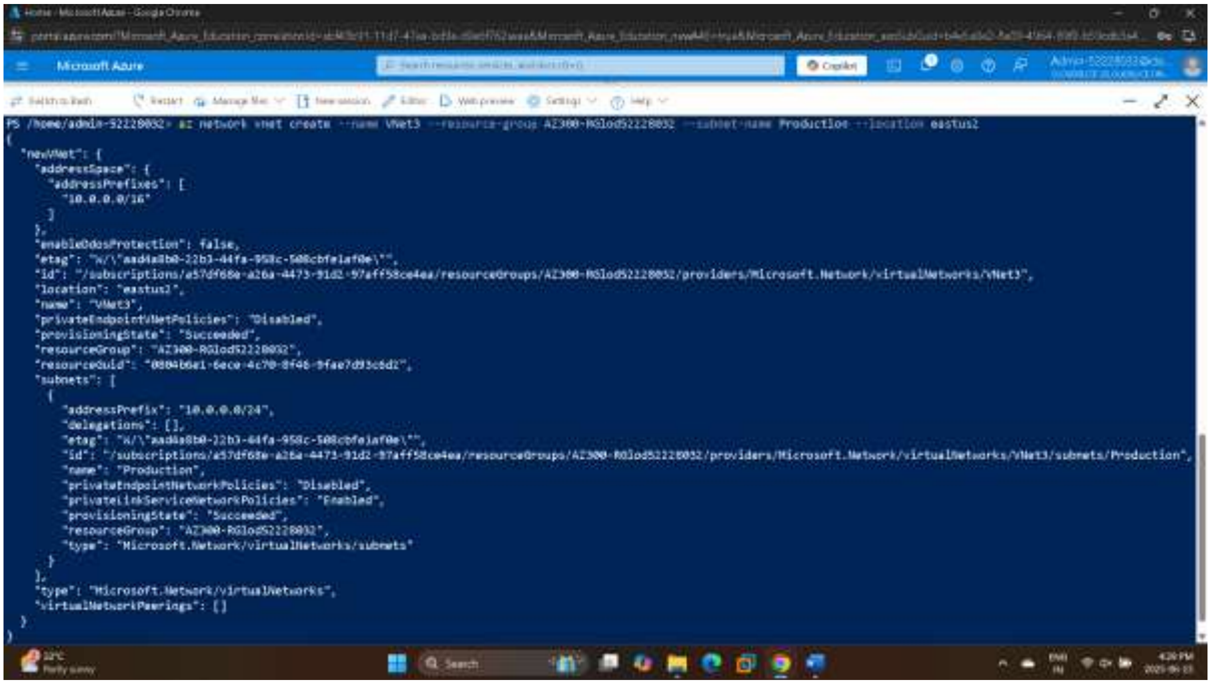
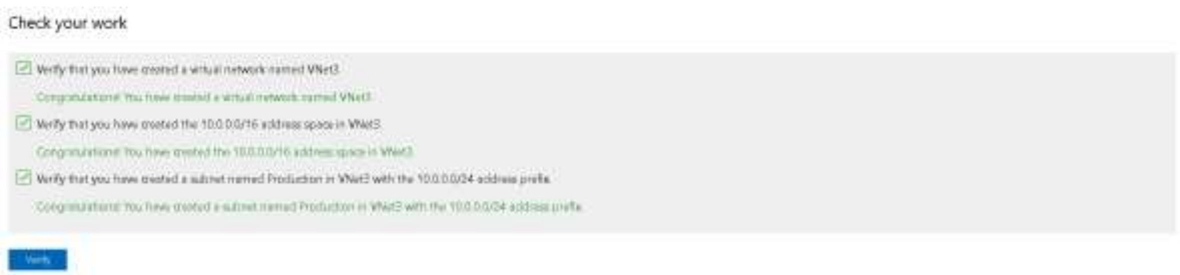

- Create an Azure virtual network by using a CLI 2.0 command

Create a VNet named VNet3 in the AZ300-RGlod52228032 resource group by using the az network vnet create cmdlet, the eastus2 region, and the Production subnet.

Run the following command to create a VNet:



```
PS /home/admin-52228032> az network vnet create --name VNet3 --resource-group AZ300-RGlod52228032 --subnet-name Production --location eastus2
{
  "newVNet": {
    "addressSpace": {
      "addressPrefixes": [
        "10.0.0.0/16"
      ]
    },
    "enableDdosProtection": false,
    "etag": "W/\"aad4a8b0-22b3-44fa-958c-508cbfe1af0e\"",
    "id": "/subscriptions/a57df68e-a26a-4473-91d2-97aff58ce4ea/resourceGroups/AZ300-RGlod52228032/providers/Microsoft.Network/virtualNetworks/VNet3",
    "location": "eastus2",
    "name": "VNet3",
    "privateEndpointVNetPolicies": "Disabled",
    "provisioningState": "Succeeded",
    "resourceGroup": "AZ300-RGlod52228032",
    "resourceGuid": "0804b6e1-6ece-4c70-8f46-9fae7d93c6d2",
    "subnets": [
      {
        "addressPrefix": "10.0.0.0/24",
        "delegations": [],
        "etag": "W/\"aad4a8b0-22b3-44fa-958c-508cbfe1af0e\"",
        "id": "/subscriptions/a57df68e-a26a-4473-91d2-97aff58ce4ea/resourceGroups/AZ300-RGlod52228032/providers/Microsoft.Network/virtualNetworks/VNet3/subnets/Production",
        "name": "Production",
        "privateEndpointNetworkPolicies": "Disabled",
        "privateLinkServiceNetworkPolicies": "Enabled",
        "provisioningState": "Succeeded",
        "resourceGroup": "AZ300-RGlod52228032",
        "type": "Microsoft.Network/virtualNetworks/subnets"
      }
    ],
    "type": "Microsoft.Network/virtualNetworks",
    "virtualNetworkPeerings": []
  }
}
```



Check your work

☑ Verify that you have created a virtual network named VNet3.

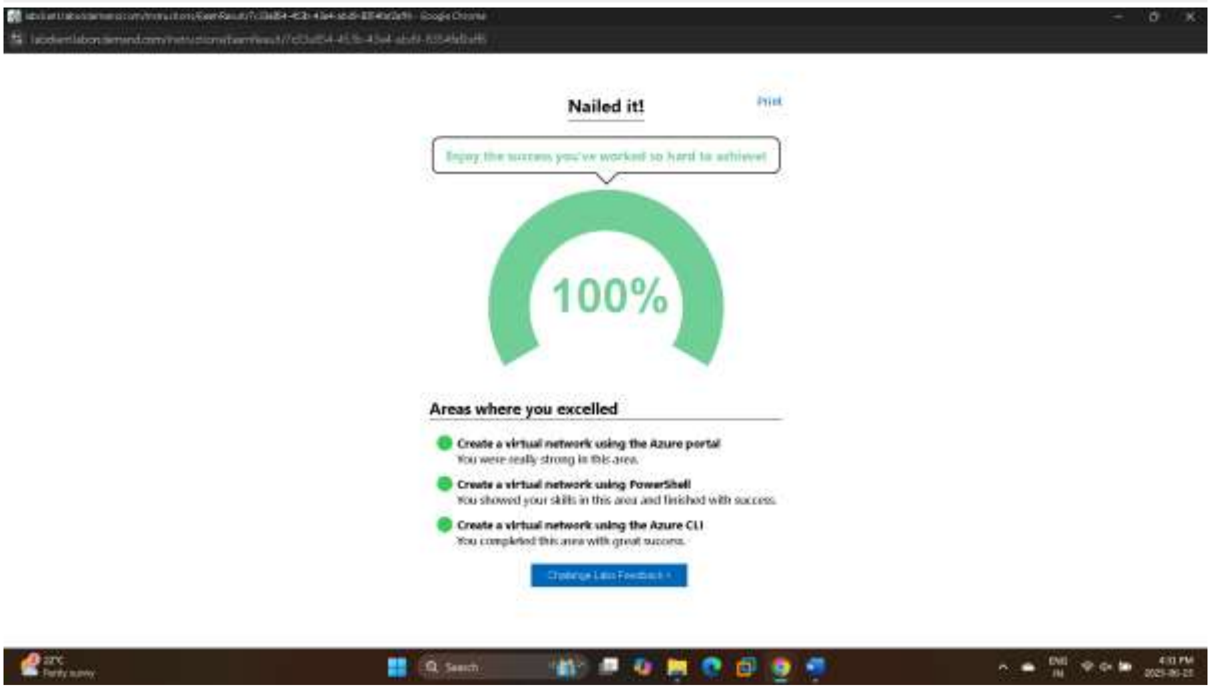
Congratulations! You have created a virtual network named VNet3.

☑ Verify that you have created the 10.0.0.0/16 address space in VNet3.

Congratulations! You have created the 10.0.0.0/16 address space in VNet3.

☑ Verify that you have created a subnet named Production in VNet3 with the 10.0.0.0/24 address prefix.

Congratulations! You have created a subnet named Production in VNet3 with the 10.0.0.0/24 address prefix.



Nailed it!

Enjoy the success you've worked so hard to achieve!

Areas where you excelled

- Create a virtual network using the Azure portal
  You were really strong in this area.
- Create a virtual network using PowerShell
  You showed your skills in this area and finished with success.
- Create a virtual network using the Azure CLI
  You completed this area with great success.

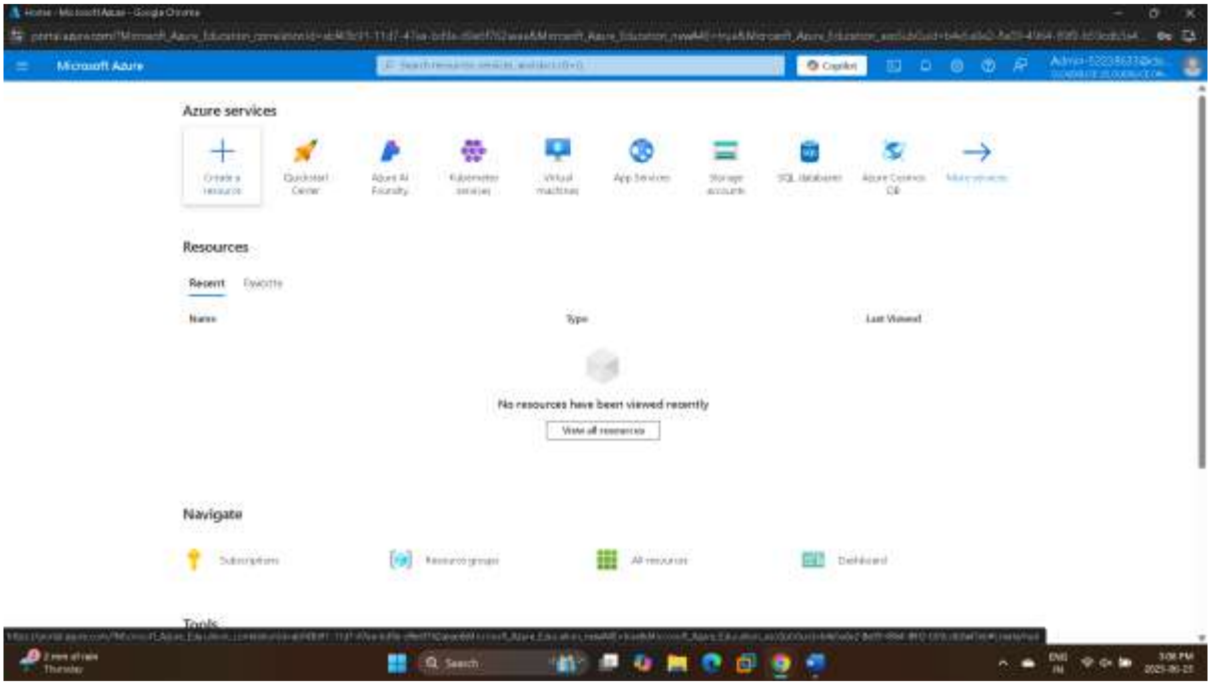
Learning & Opinion

A virtual network is a representation of a network in the cloud. It provides isolation, segmentation, and routing capabilities for Azure resources. When creating a virtual network, it's important to define non-overlapping IP address ranges to prevent conflicts, especially in hybrid or peered environments. Subnets help organize and segment the network by breaking it into smaller address spaces, each serving specific resource groups or functions. Planning IP ranges carefully ensures that the network scales efficiently and securely. Tools like the Azure Portal, PowerShell, and CLI provide flexibility in how we deploy and manage virtual networks. Understanding how address spaces and subnets work together is essential for effective network design in Azure.

Task02: Implement an Azure Load Balancer

- Create a Load Balancer named MyLoadBalancer by using the values in the following table. For any property not specified, use the default value.

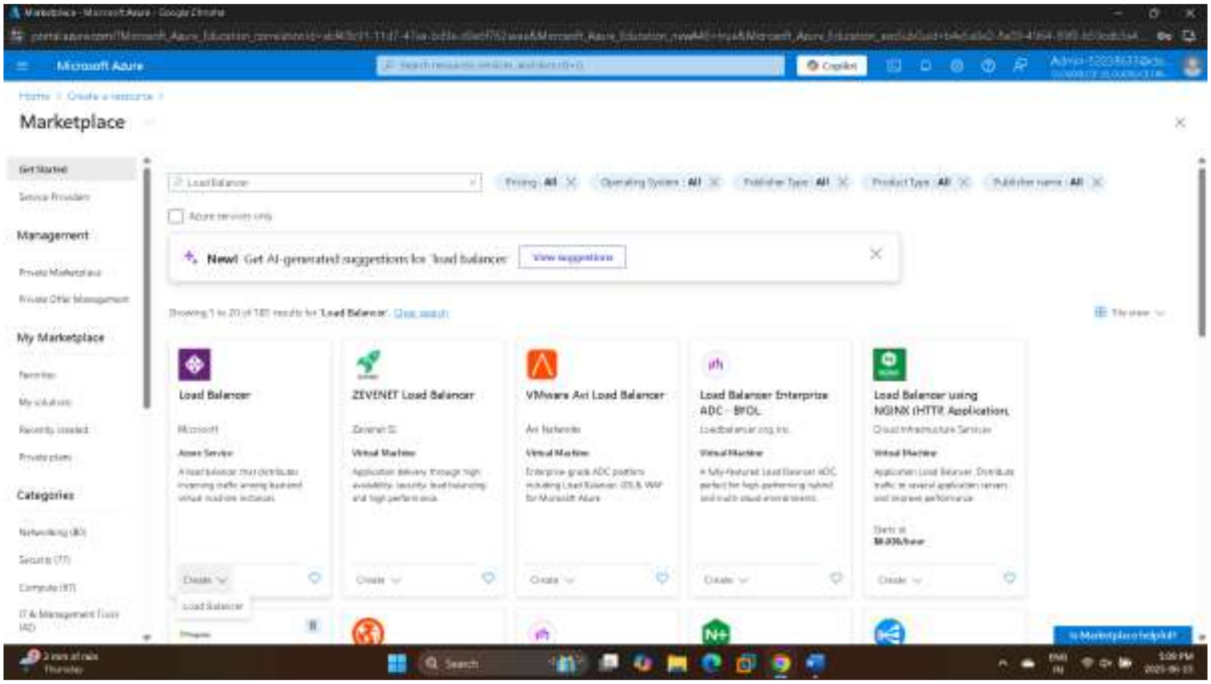
Sign in to the Azure portal



On the Azure portal home page, in Azure services, select Create a resource.

In the Azure Marketplace, search for and select Load Balancer, and then select the Load Balancer tile.

On the Load Balancer blade, select Create.

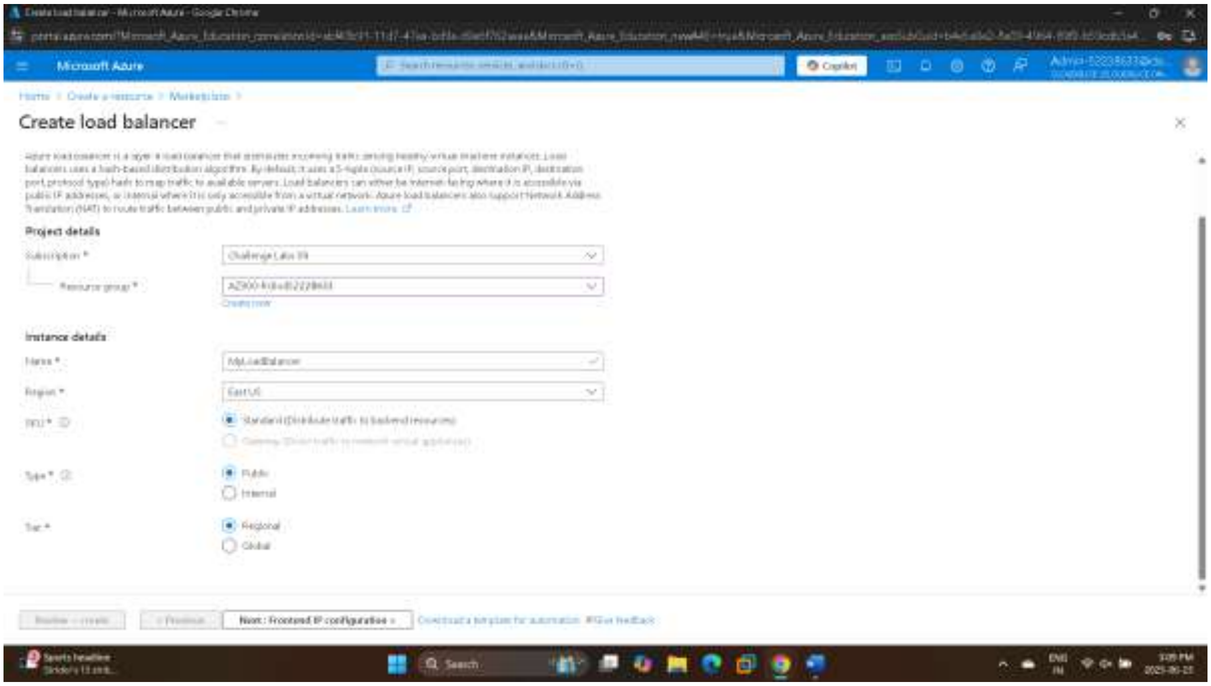


On the Create load balancer blade, on the Basics page, in Project details, in Resource group, select AZ300-RGlod52228633.

In Instance details, in Name, enter MyLoadBalancer.

In Region, select East US.

In SKU, select Standard (Recommended), and then in Type, select Public.



Create load balancer

Azure load balancer is a layer 4 load balancer that distributes incoming traffic among healthy virtual machine instances. Load balancers uses a hash-based distribution algorithm. By default, it uses a 5-tuple (source IP, source port, destination IP, destination port, protocol type) hash to map traffic to available servers. Load balancers can either be internet-facing where it is accessible via public IP addresses, or internal where it is only accessible from a virtual network. Azure load balancers also support Network Address Translation (NAT) to route traffic between public and private IP addresses. Learn more

Project details

Subscription * Challenge Labs 39

Resource group * AZ300-RGlod52228633

Instance details

Name * MyLoadBalancer

Region * East US

SKU * ● Standard (Distribute traffic to backend resources) ○ Gateway (Direct traffic to network virtual appliances)

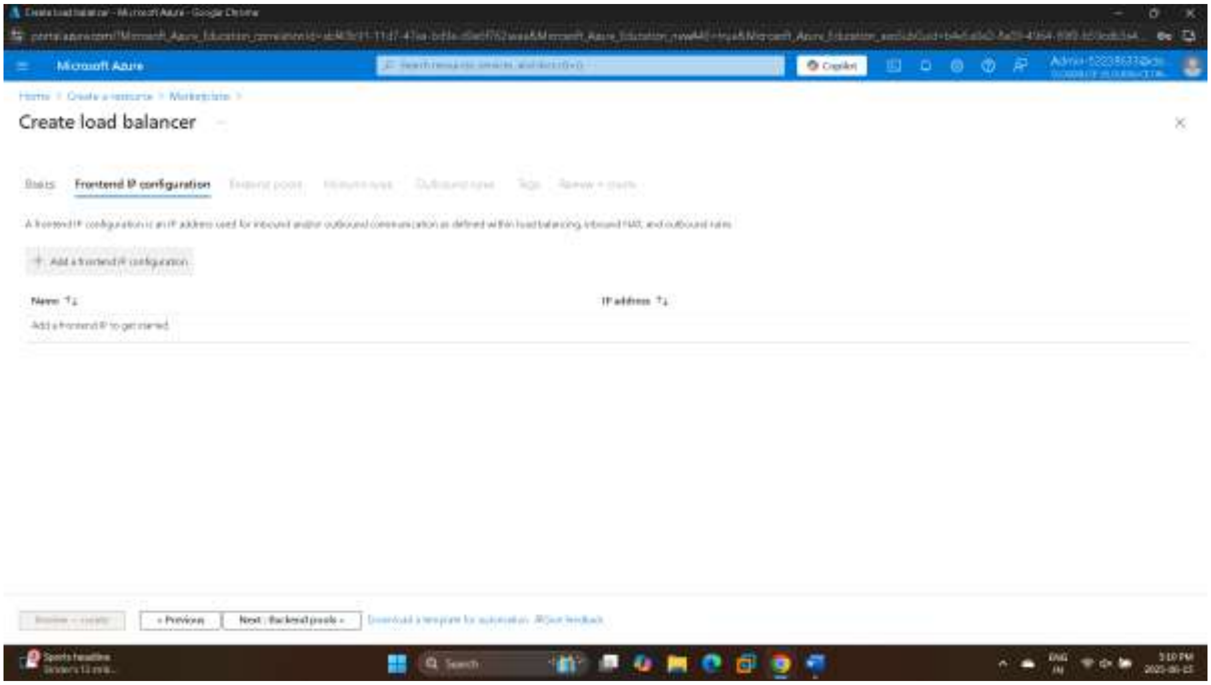
Type * ● Public ○ Internal

Tier * ● Regional ○ Global

Microsoft Azure
Home > Create a resource > Marketplace >
Create new
Review + create
< Previous
Next : Frontend IP configuration >
Download a template for automation
Give feedback

Select Next: Fronted IP configuration, and then select Add a frontend IP configuration.

On the Add frontend IP address blade, in Name, enter LB-FIP52228633, and then in Public IP address, select Create new.

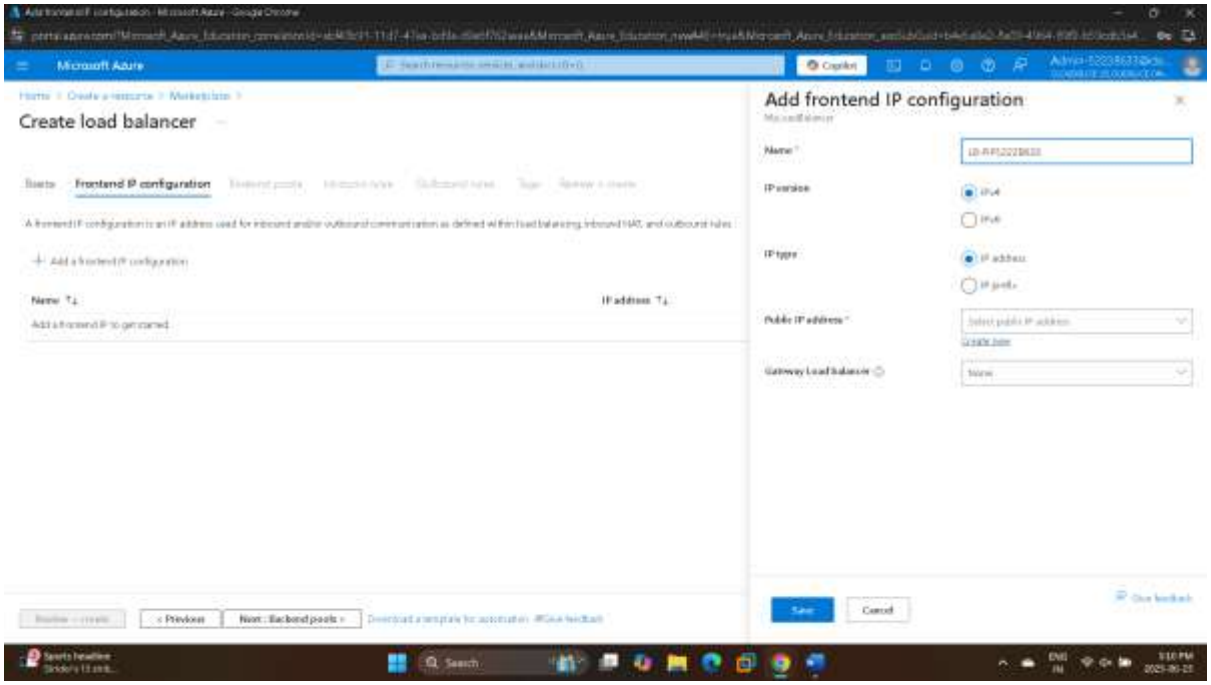

Create load balancer - Microsoft Azure - Google Chrome
Microsoft Azure
Copilot
Home > Create a resource > Marketplace >
Basics
Frontend IP configuration
Backend pools
Inbound rules
Outbound rules
Tags
Review + create
Review + create
< Previous
Next : Backend pools >
Download a template for automation
Give feedback

Create load balancer

A frontend IP configuration is an IP address used for inbound and/or outbound communication as defined within load balancing, inbound NAT, and outbound rules

+ Add a frontend IP configuration

Name ↑↓	IP address ↑↓
Add a frontend IP to get started	


Add frontend IP configuration - Microsoft Azure - Google Chrome
Microsoft Azure
Copilot
Home > Create a resource > Marketplace >
Create load balancer
Basics
Frontend IP configuration
Backend pools
Inbound rules
Outbound rules
Tags
Review + create
+ Add a frontend IP configuration
Name ↑↓
IP address ↑↓
Add a frontend IP to get started
Review + create
< Previous
Next : Backend pools >
Download a template for automation
Give feedback
Save
Cancel
Give feedback

Add frontend IP configuration

Name * LB-FIP52228633

IP version ● IPv4 ○ IPv6

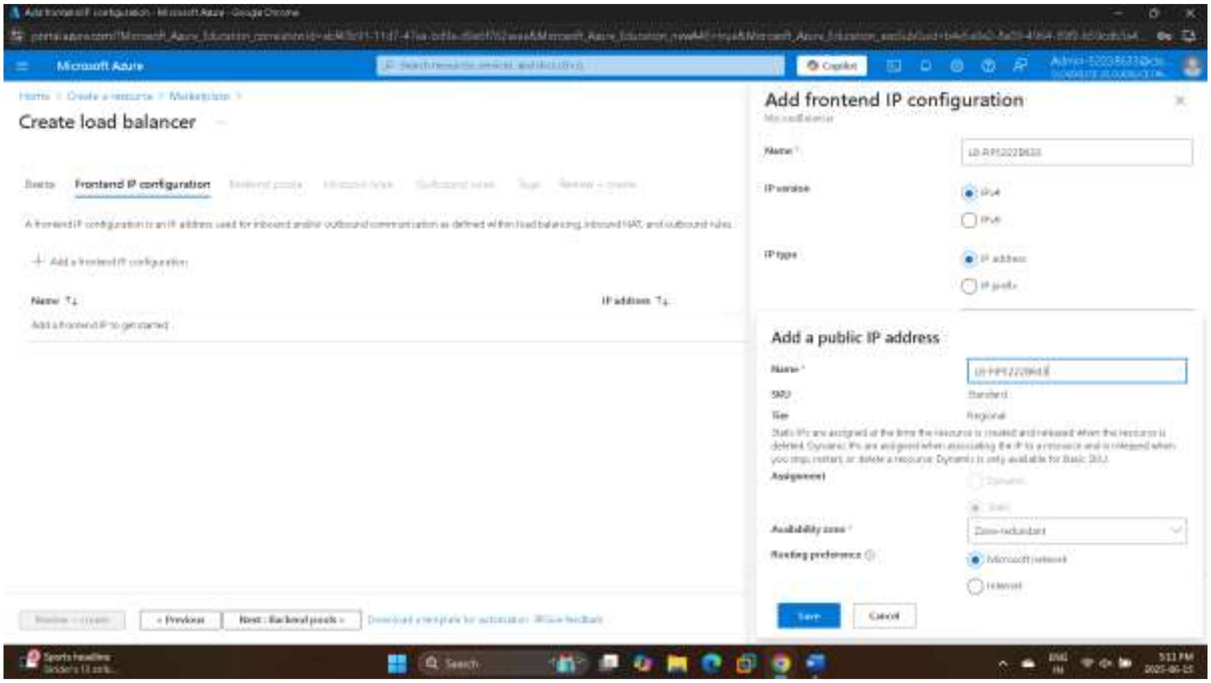
IP type ● IP address ○ IP prefix

Public IP address * Select public IP address

Create new

Gateway Load balancer None

In the Add a public IP address tile, in Name, enter LB-PIP52228633, in Availability zone, select Zone-redundant, and then select Save.



Create load balancer

Basics | Frontend IP configuration | Backend pools | Inbound rules | Outbound rules | Tags | Review + create

Add frontend IP configuration

Name * [illegible]

IP version ● IPv4 ○ IPv6

IP type ● IP address ○ IP prefix

Add a public IP address

Name * [illegible]

SKU Standard

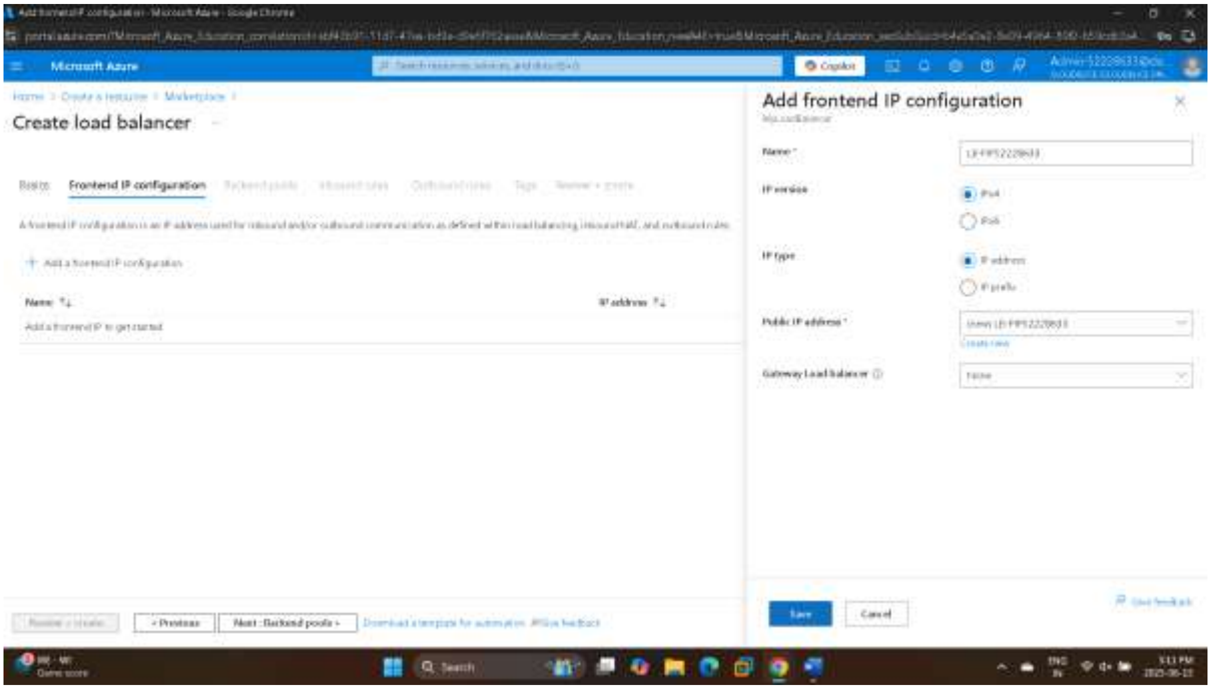
Tier Regional

Assignment ○ Dynamic ● Static

Availability zone * Zone-redundant

Routing preference ● Microsoft network ○ Internet

On the Add frontend IP configuration blade, select Save to add the frontend IP address.



Create load balancer

Basics | Frontend IP configuration | Backend pools | Inbound rules | Outbound rules | Tags | Review + create

Add frontend IP configuration

Name * [illegible]

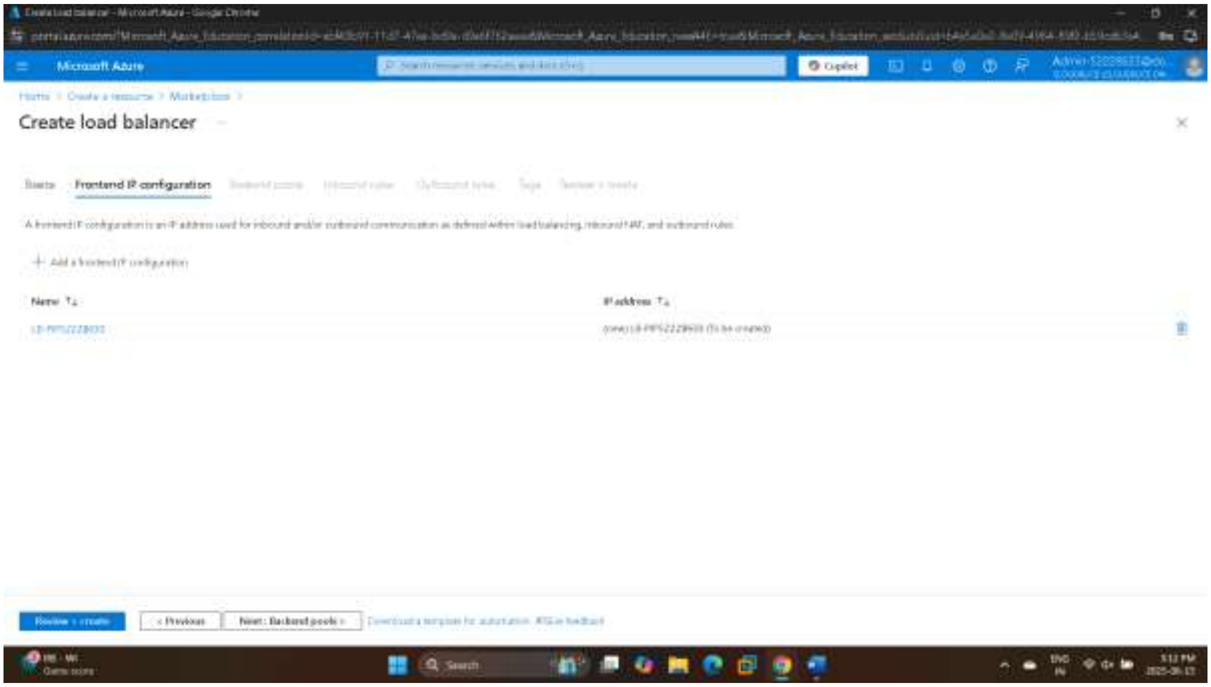
IP version ● IPv4 ○ IPv6

IP type ● IP address ○ IP prefix

Public IP address * (New) [illegible]

Gateway Load balancer None

On the Create load balancer blade, select Review + create.



Create load balancer

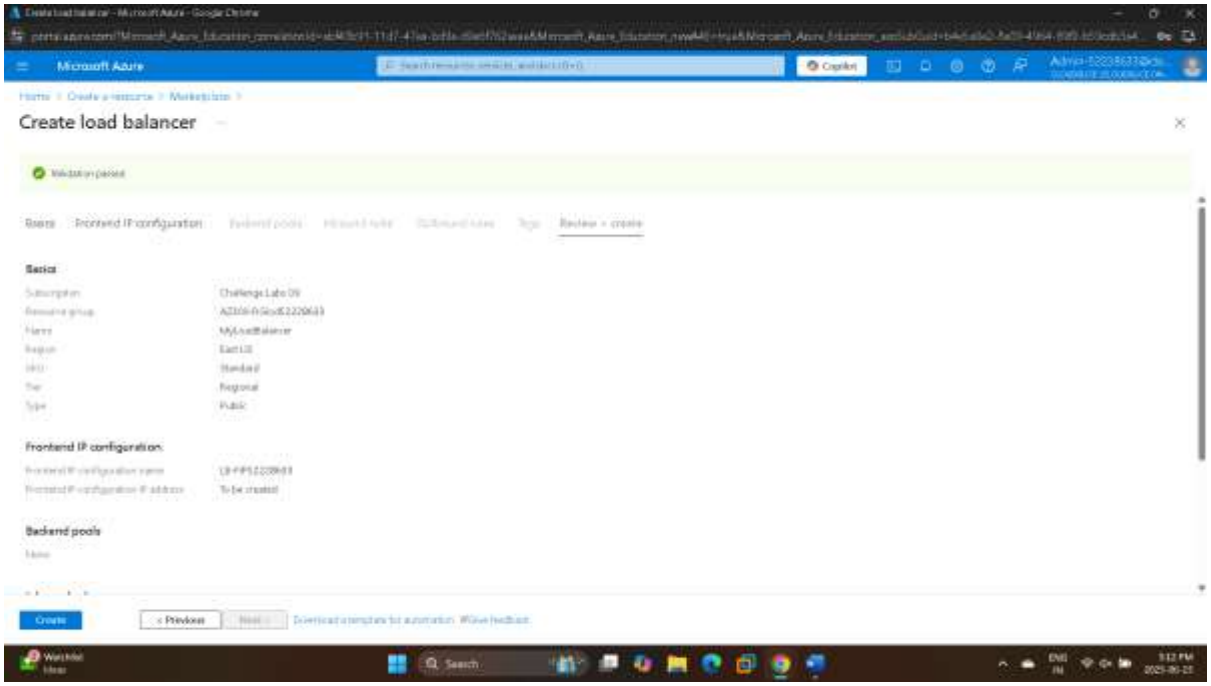
Basics | Frontend IP configuration | Backend pools | Inbound rules | Outbound rules | Tags | Review + create

A frontend IP configuration is an IP address used for inbound and/or outbound communication as defined within load balancing, inbound NAT, and outbound rules.

+ Add a frontend IP configuration

Name ↑↓	IP address ↑↓
LB-PIP52228633	(new) LB-PIP52228633 (To be created)

Review the configuration, and then select Create.



Create load balancer

Validation passed

Basics | Frontend IP configuration | Backend pools | Inbound rules | Outbound rules | Tags | Review + create

Basics

Subscription	Challenge Labs 09
Resource group	AZ104-RGlod52228633
Name	MyLoadBalancer
Region	East US
SKU	Standard
Tier	Regional
Type	Public

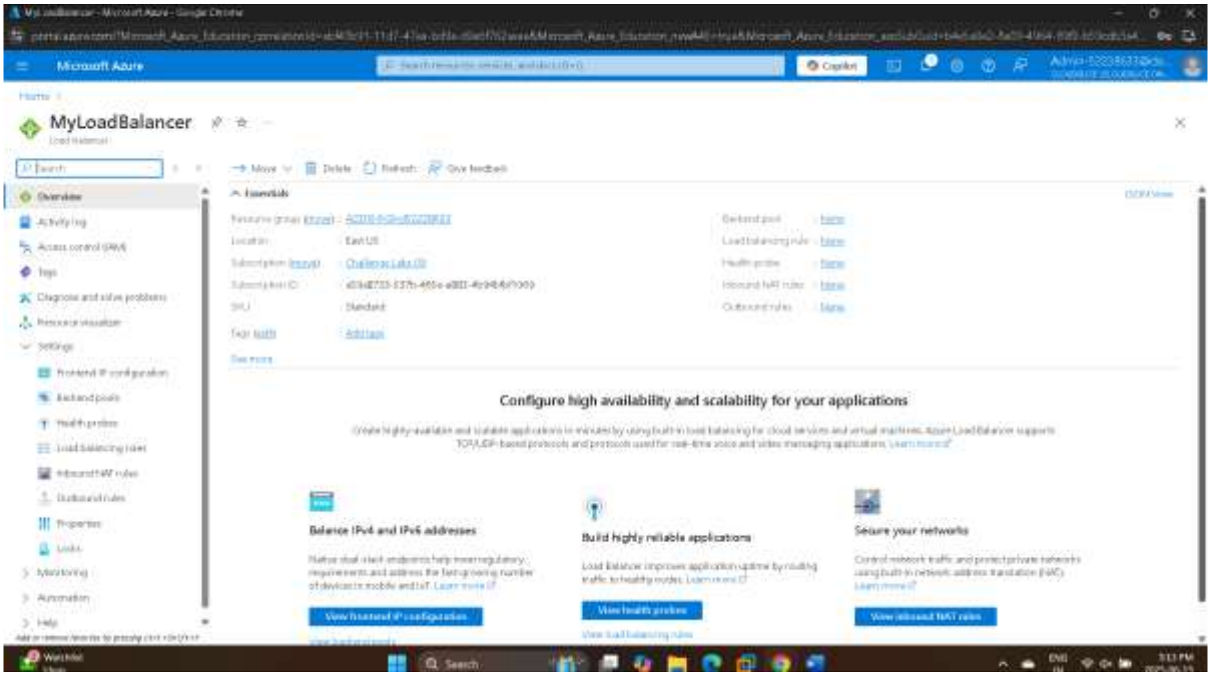
Frontend IP configuration

Frontend IP configuration name	LB-PIP52228633
Frontend IP configuration IP address	To be created

Backend pools

None

Microsoft Azure
Home > Create a resource > Marketplace >
Create
< Previous
Next >
Download a template for automation
Give feedback

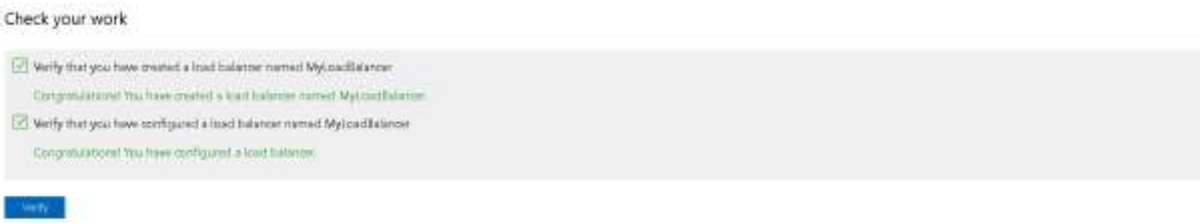


MyLoadBalancer

Load balancer

Essentials

Resource group (move)	[illegible]
Location	East US
Subscription (move)	Challenge Labs 03
Subscription ID	[illegible]
SKU	Standard
Tags (edit)	Add tags



Check your work

☑ Verify that you have created a load balancer named MyLoadBalancer

Congratulations! You have created a load balancer named MyLoadBalancer

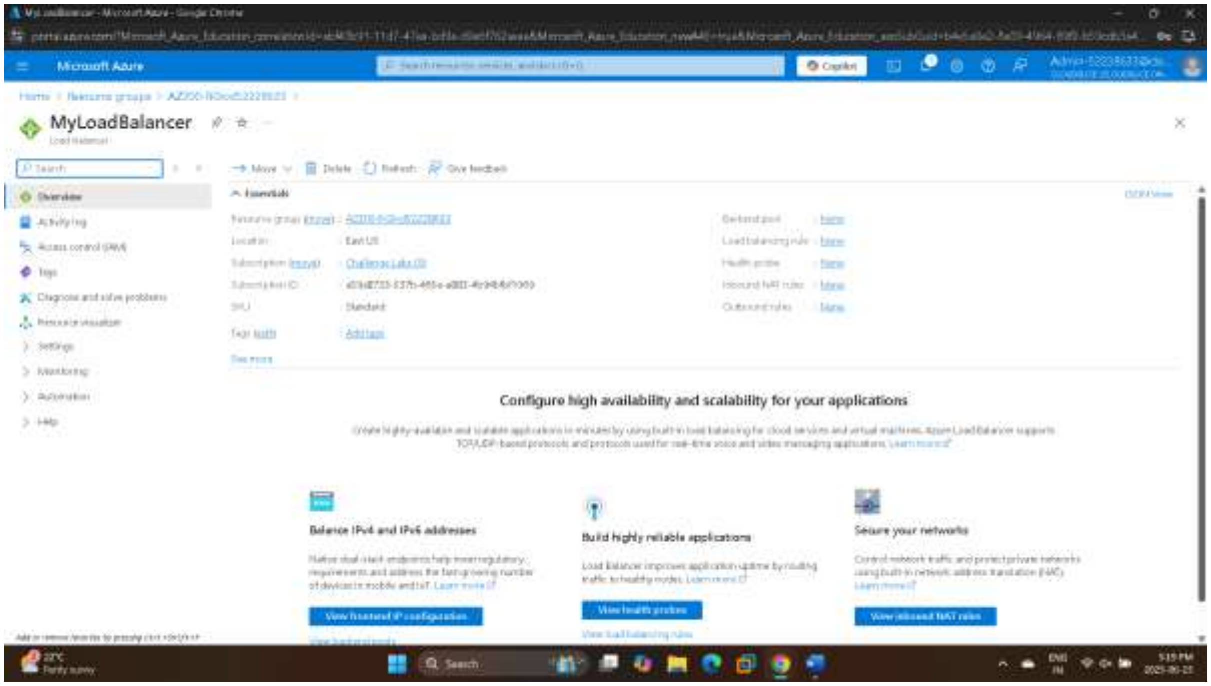
☑ Verify that you have configured a load balancer named MyLoadBalancer

Congratulations! You have configured a load balancer

Create load balancer resources

- Create a backend pool named MyBackendPool in the MyLoadBalancer load balancer, configure the backend pool to use the MyVNet virtual network and contain VM1, VM2, and VM3, and then ensure that each virtual machine is configured to use the IP address to which it is dynamically assigned.

On the Deployment blade, select Go to resource.



MyLoadBalancer

Essentials

Location: East US

SKU: Standard

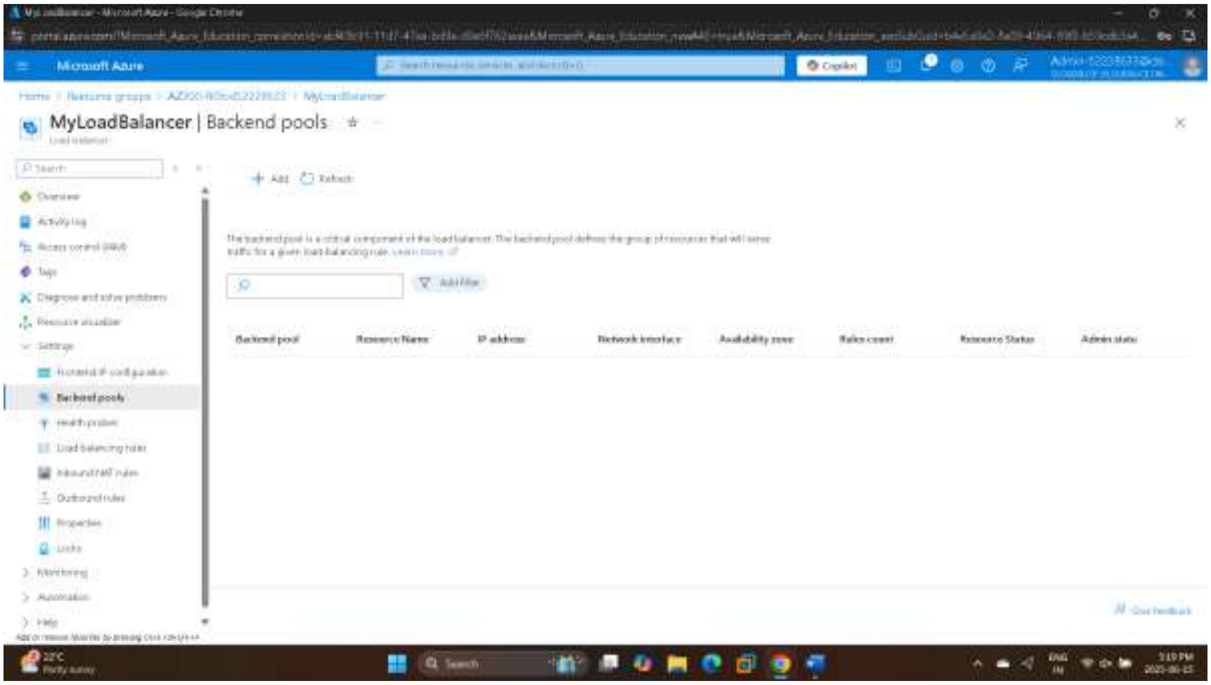
Configure high availability and scalability for your applications

Balance IPv4 and IPv6 addresses

Build highly reliable applications

Secure your networks

On the MyLoadBalancer service menu, in Settings, select Backend pools.



MyLoadBalancer | Backend pools

The backend pool is a critical component of the load balancer. The backend pool defines the group of resources that will serve traffic for a given load balancing rule. Learn more

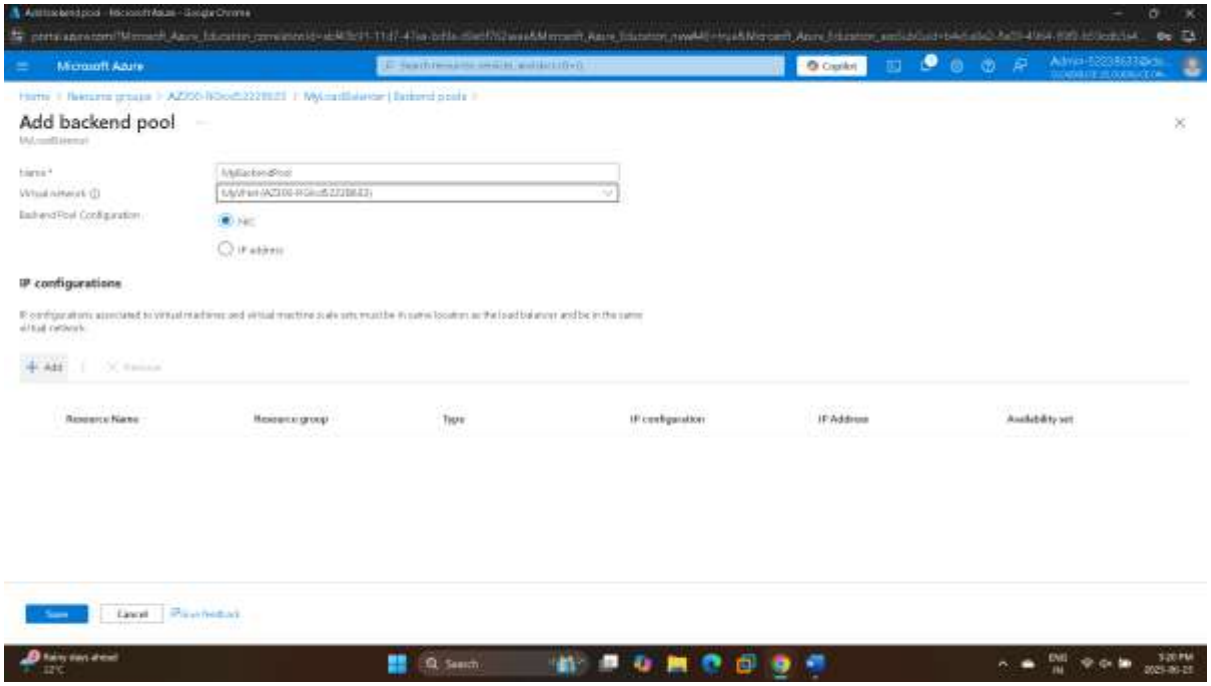
Backend pool	Resource Name	IP address	Network interface	Availability zone	Rules count	Resource Status	Admin state

On the Backend pools command bar, select +Add.

On the Add backend pool blade, in Name, enter MyBackendPool.

In Virtual network, select MyVNet (AZ300-RGlod52228633).

In IP configurations, select Add.



Add backend pool

Name * MyBackendPool

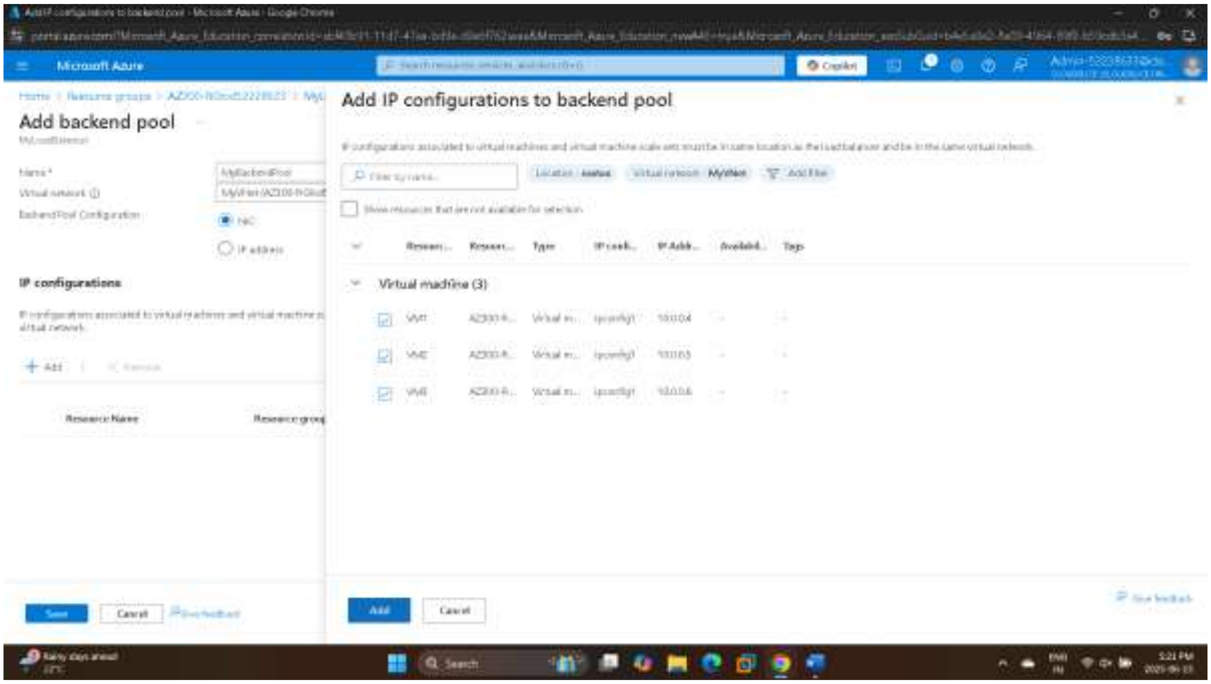
Virtual network MyVNet

Backend Pool Configuration ● NIC ○ IP address

IP configurations

Resource Name	Resource group	Type	IP configuration	IP Address	Availability set

On the Add IP configurations to backend pool blade, select the VM1, VM2, and VM3 checkboxes, and then select Add.



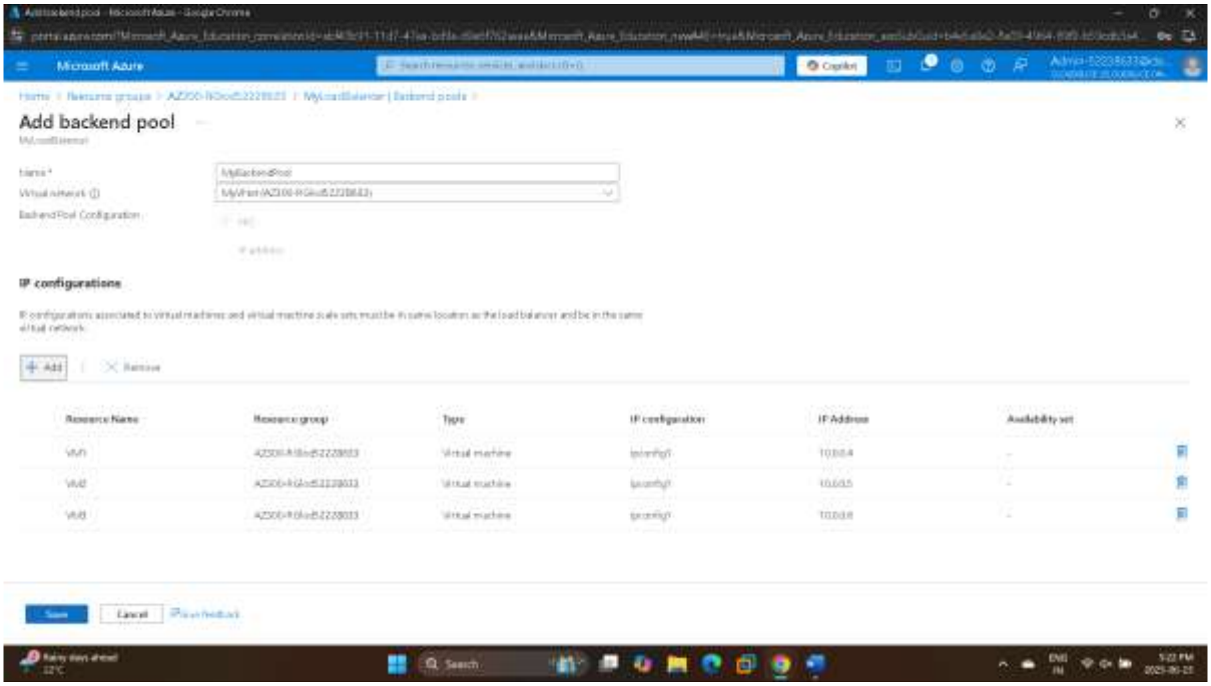
Add IP configurations to backend pool

Virtual network : MyVNet

Virtual machine (3)

	Resource...	Resource...	Type	IP conf...	IP Addr...	Availabl...	Tags
☑	VM1	AZ300-R...	Virtual m...	ipconfig1	10.0.0.4	-	-
☑	VM2	AZ300-R...	Virtual m...	ipconfig1	10.0.0.5	-	-
☑	VM3	AZ300-R...	Virtual m...	ipconfig1	10.0.0.6	-	-

On the Add backend pool blade, review the configuration, and then select Save.



Add backend pool

Name * MyBackendPool

Virtual network MyVNet (AZ500-RGlod52228033)

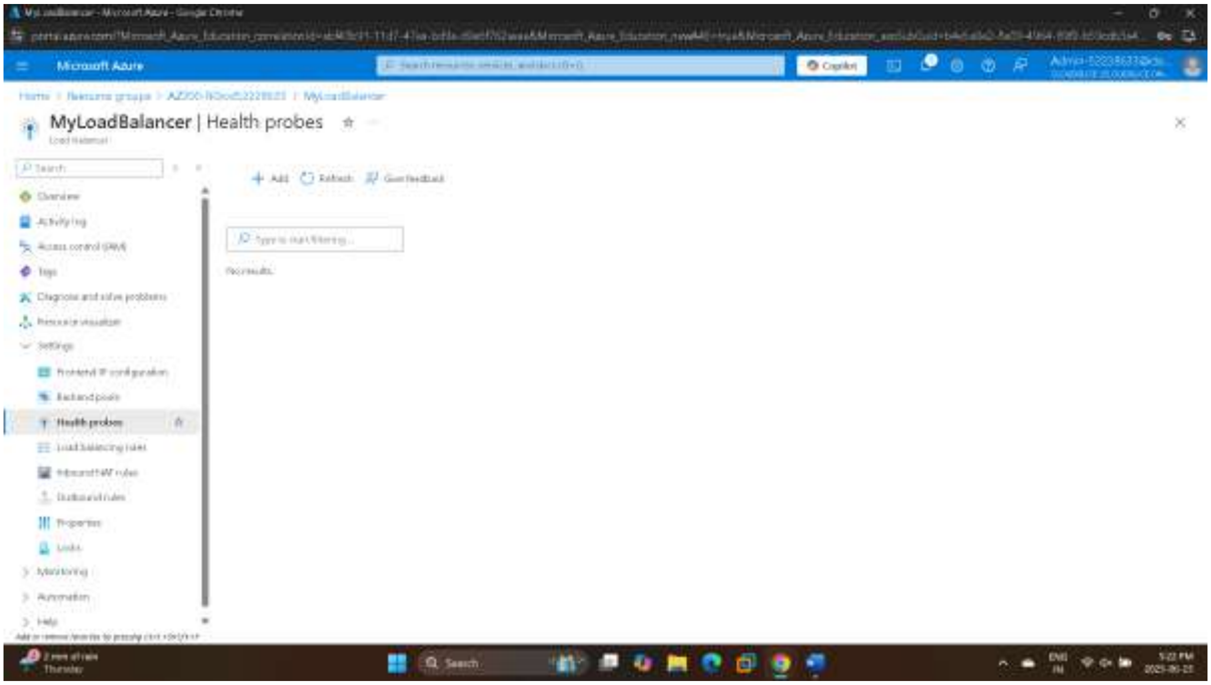
IP configurations

IP configurations associated to virtual machines and virtual machine scale sets must be in same location as the load balancer and be in the same virtual network.

Resource Name	Resource group	Type	IP configuration	IP Address	Availability set
VM1	AZ500-RGlod52228033	Virtual machine	ipconfig1	10.0.0.4	-
VM2	AZ500-RGlod52228033	Virtual machine	ipconfig1	10.0.0.5	-
VM3	AZ500-RGlod52228033	Virtual machine	ipconfig1	10.0.0.6	-

- Create an HTTP health probe named MyHealthProbe in MyLoadBalancer by using port 80, and an interval of 15.

On the MyLoadBalancer service menu, in Settings, select Health probes.



MyLoadBalancer | Health probes

No results.

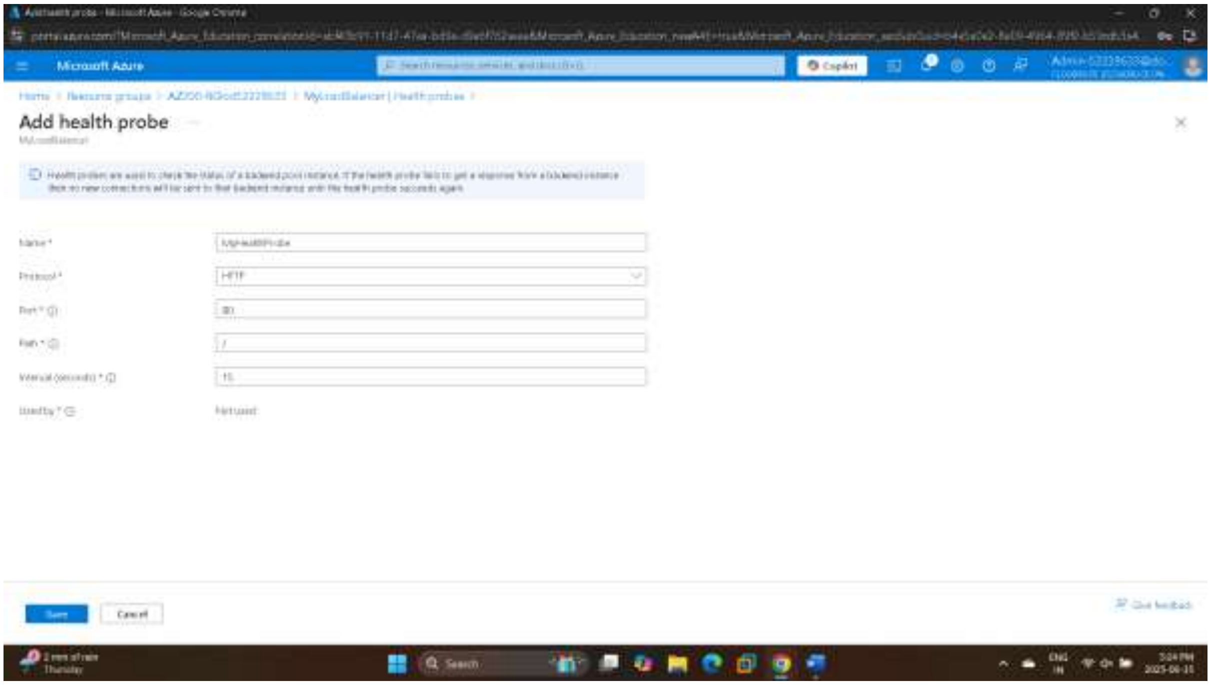
On the Health probes command bar, select Add.

On the Add health probe blade, in Name, enter MyHealthProbe.

In Protocol, select HTTP.

In Port, ensure that the value is set to 80.

In Interval, enter 15, and then select Save.



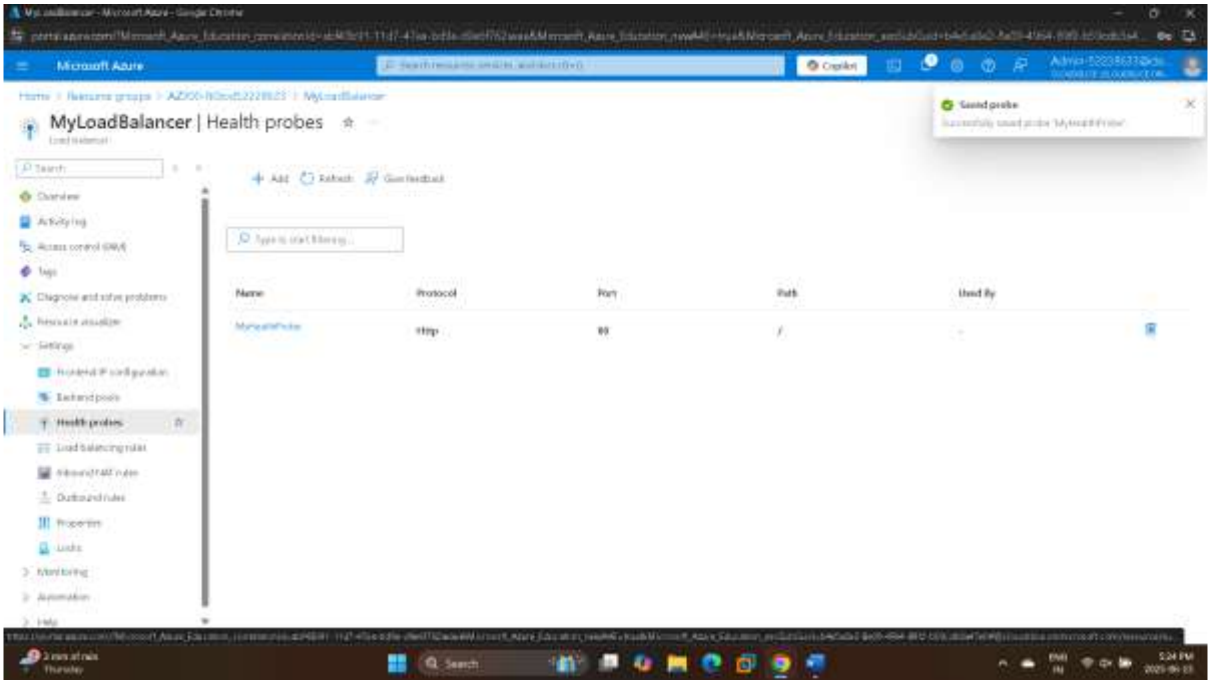
Add health probe

MyLoadBalancer

Health probes are used to check the status of a backend pool instance. If the health probe fails to get a response from a backend instance then no new connections will be sent to that backend instance until the health probe succeeds again.

Name *	MyHealthProbe
Protocol *	HTTP
Port *	80
Path *	/
Interval (seconds) *	15
Used by *	Not used

Microsoft Azure
Home > Resource groups > AZ500-RGod52228633 > MyLoadBalancer | Health probes >
Save
Cancel
Give feedback



MyLoadBalancer | Health probes

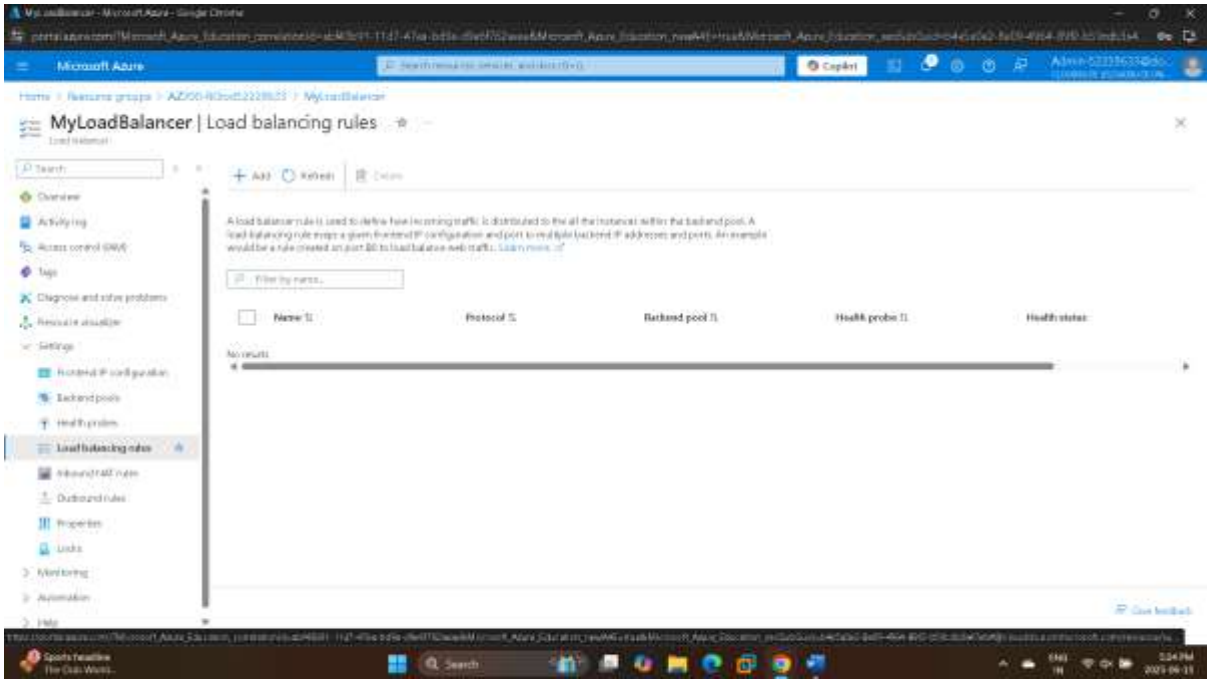
Saved probe

Successfully saved probe 'MyHealthProbe'

Name	Protocol	Port	Path	Used By
MyHealthProbe	Http	80	/	-

- Create a load balancing rule named MyHTTPRule using the values in the following table. For any property not specified, use the default value.

On the MyLoadBalancer service menu, select Load balancing rules.



MyLoadBalancer | Load balancing rules

A load balancer rule is used to define how incoming traffic is distributed to the all the instances within the backend pool. A load balancing rule maps a given frontend IP configuration and port to multiple backend IP addresses and ports. An example would be a rule created on port 80 to load balance web traffic. Learn more

☐	Name	Protocol	Backend pool	Health probe	Health status

No results

On the Load balancing rules page, on the command bar, select +Add.

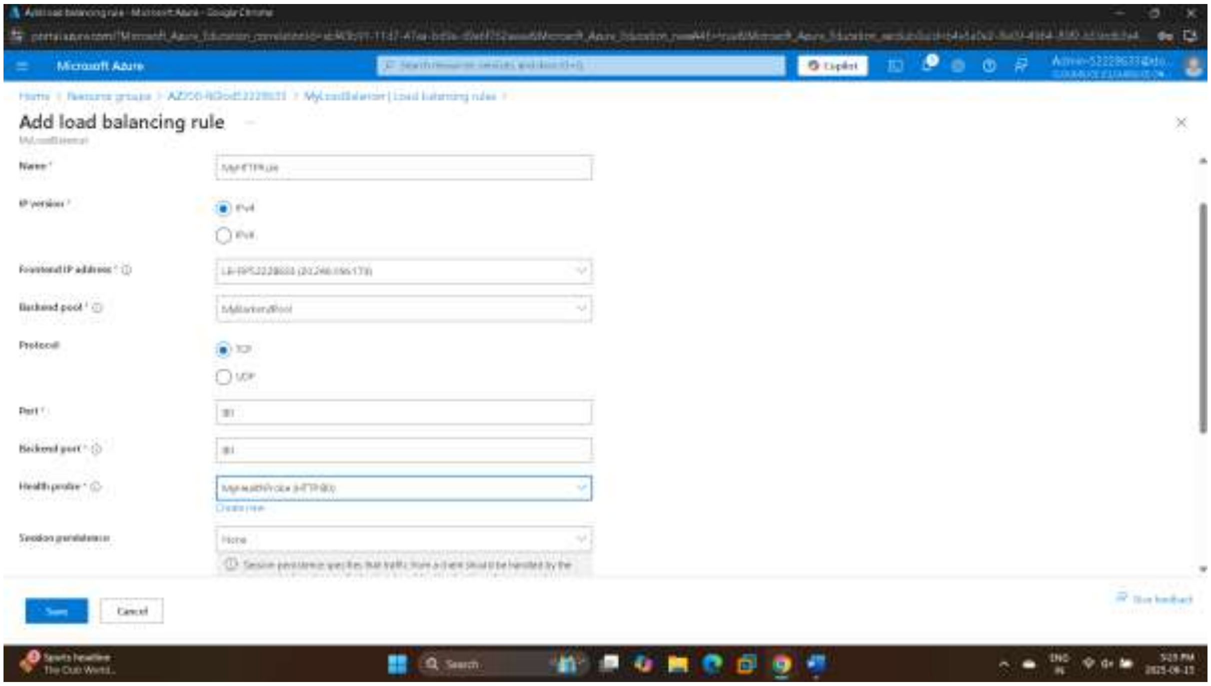
On the Add load balancing rule blade, in Name, enter MyHTTPRule.

In Frontend IP address, select LB-FIP52228633.

In Backend pool, select MyBackendPool.

In Port, enter 80, and then in Backend port, enter 80.

In Health probe, select MyHealthProbe (HTTP:80)-the health probe may take a few minutes to become fully available. If it does not appear, wait a few minutes and refresh the page.



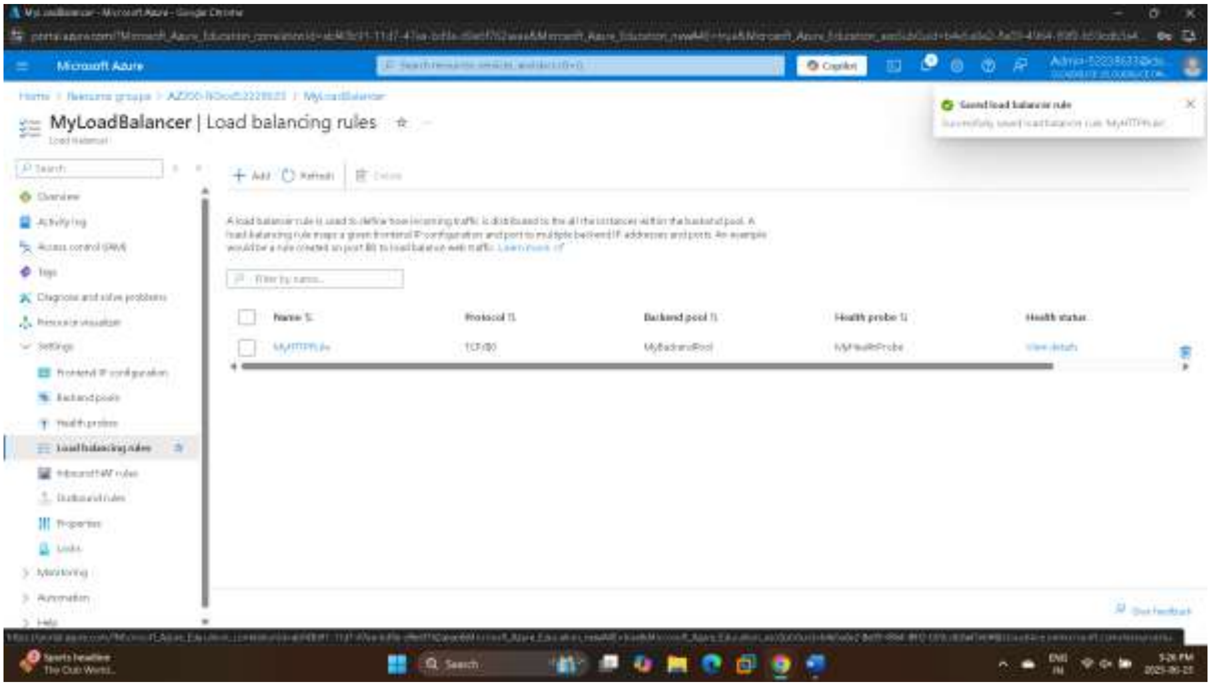
Add load balancing rule

Microsoft Azure
Copilot
Home > Resource groups > AZ500-RGrod52228633 > MyLoadBalancer | Load balancing rules >
Create new
Save
Cancel
Give feedback

Name *	MyHTTPRule
IP version *	● IPv4 ○ IPv6
Frontend IP address *	LB-FIP52228633 (20.246.156.179)
Backend pool *	MyBackendPool
Protocol	● TCP ○ UDP
Port *	80
Backend port *	80
Health probe *	MyHealthProbe (HTTP:80)
Session persistence	None

Session persistence specifies that traffic from a client should be handled by the

Review all remaining default values, and then select Save.



MyLoadBalancer | Load balancing rules

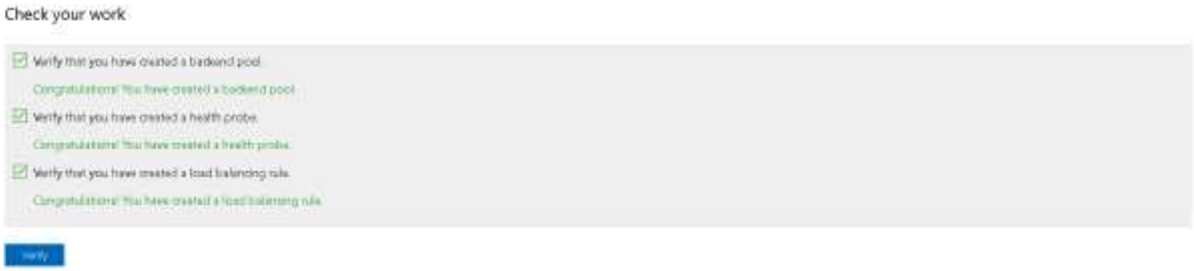
Load balancer

Saved load balancer rule

Successfully saved load balancer rule MyHTTPRule

A load balancer rule is used to define how incoming traffic is distributed to the all the instances within the backend pool. A load balancing rule maps a given frontend IP configuration and port to multiple backend IP addresses and ports. An example would be a rule created on port 80 to load balance web traffic. Learn more

Name	Protocol	Backend pool	Health probe	Health status
MyHTTPRule	TCP/80	MyBackendPool	MyHealthProbe	View details



Check your work

☑ Verify that you have created a backend pool

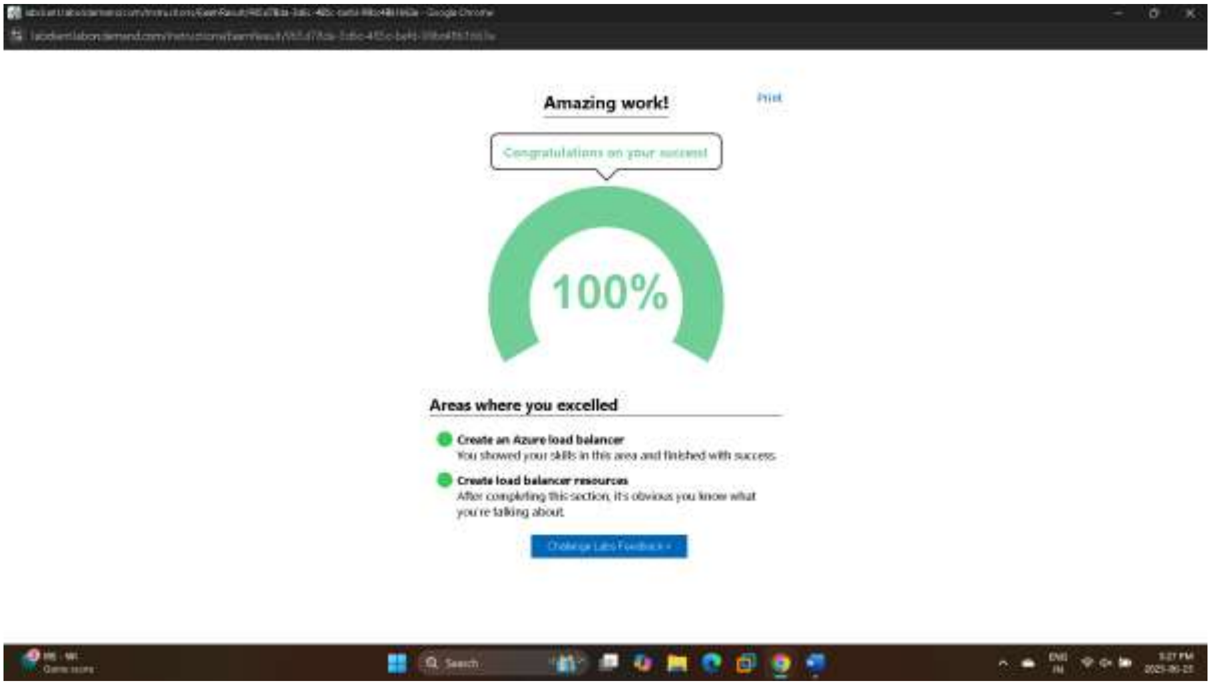
Congratulations! You have created a backend pool

☑ Verify that you have created a health probe.

Congratulations! You have created a health probe.

☑ Verify that you have created a load balancing rule.

Congratulations! You have created a load balancing rule.



Amazing work!

Congratulations on your success!

100%

Areas where you excelled

- Create an Azure load balancer
  You showed your skills in this area and finished with success.
- Create load balancer resources
  After completing this section, it's obvious you know what you're talking about.

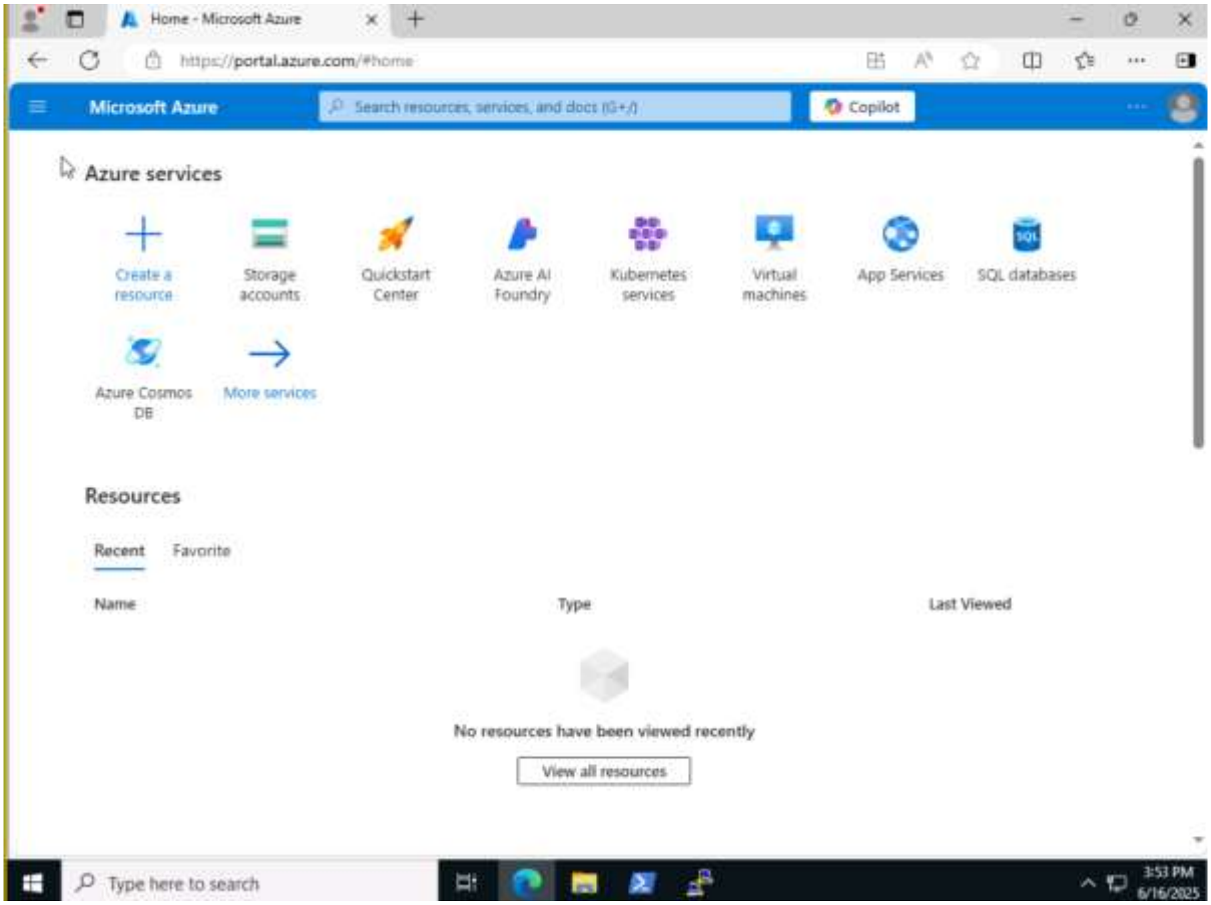
Learning & Opinion

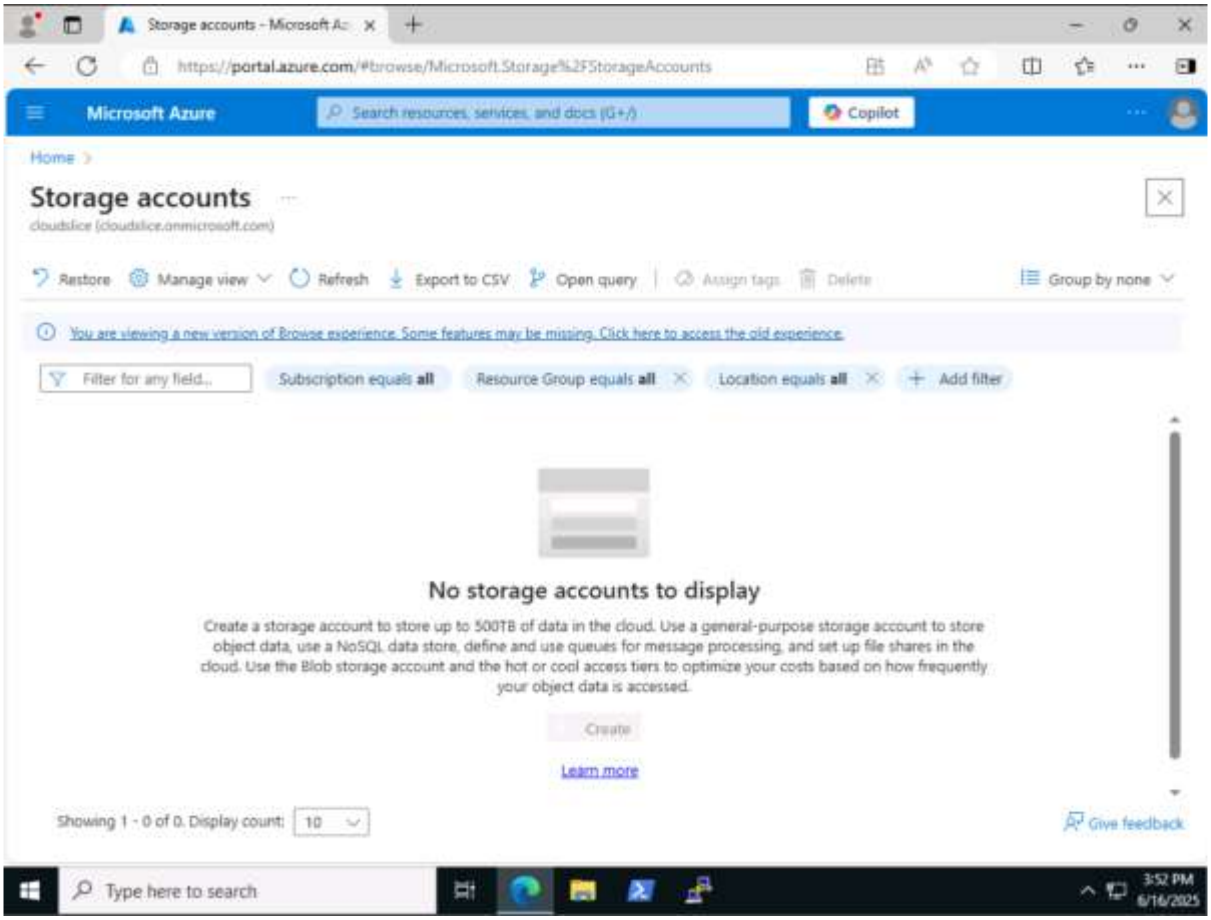
An Azure Load Balancer distributes incoming traffic evenly across multiple virtual machines because it improves availability as well as scalability. Frontend IP configurations, backend pools, and health probes are used to monitor services' health. Health probes make sure that traffic goes only to VMs that are healthy because they do reduce downtime. Traffic routing is defined by load balancing rules that are based on protocols as well as ports. For the designing of fault-tolerant applications, benefit results from the comprehension of these components. The Standard SKU that has zone-redundancy is highly available when it is used across regions. This setup in production environments ensures efficient traffic management with resilience.

Task 03: Use Azure Storage Explorer

- Create an Azure Storage Account

On the Microsoft Azure portal home page, in Azure services, select Storage accounts.





Storage accounts - Microsoft Az
https://portal.azure.com/#browse/Microsoft.Storage%2FStorageAccounts
Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home >
Storage accounts
cloudslice (cloudslice.onmicrosoft.com)
Restore
Manage view
Refresh
Export to CSV
Open query
Assign tags
Delete
Group by none
You are viewing a new version of Browse experience. Some features may be missing. Click here to access the old experience.
Filter for any field...
Subscription equals all
Resource Group equals all
Location equals all
Add filter

No storage accounts to display

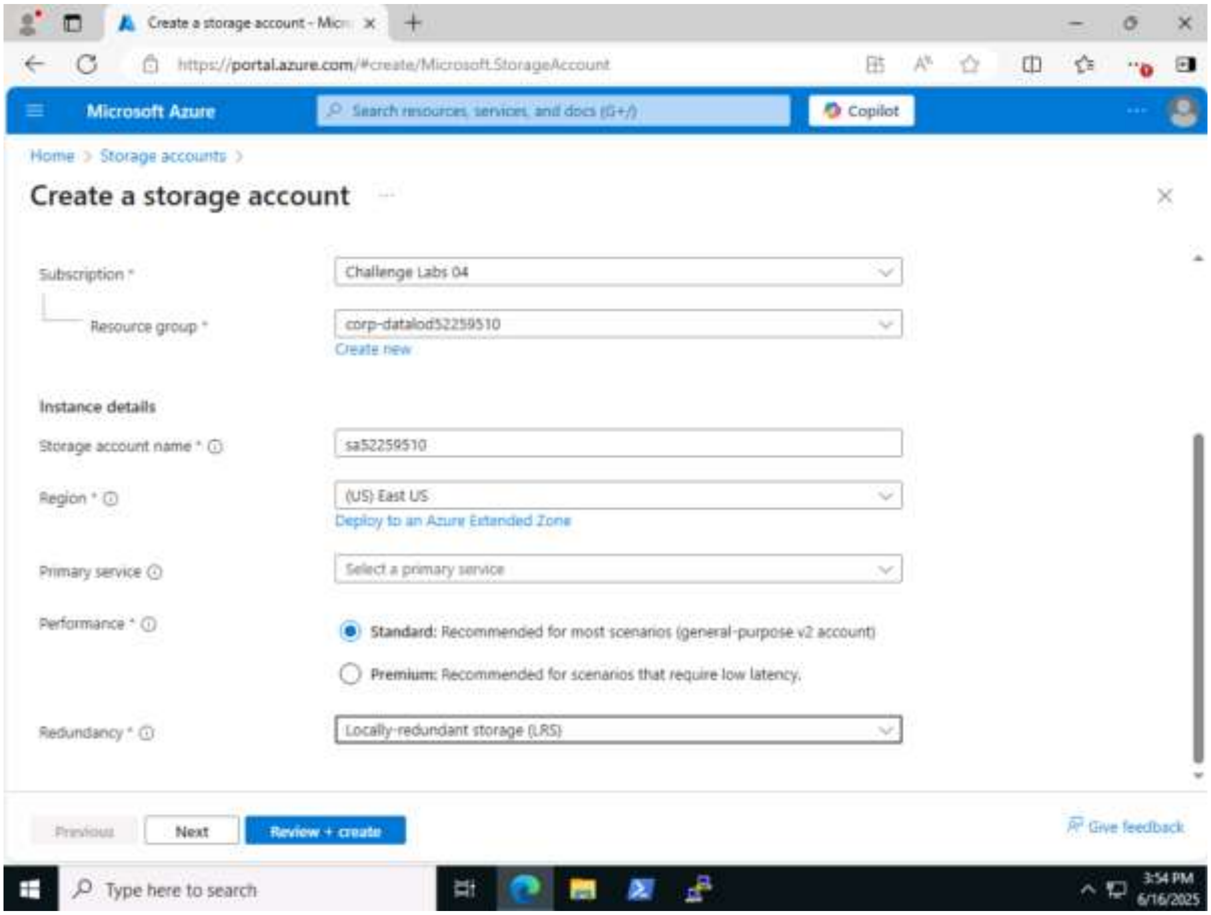
Create a storage account to store up to 500TB of data in the cloud. Use a general-purpose storage account to store object data, use a NoSQL data store, define and use queues for message processing, and set up file shares in the cloud. Use the Blob storage account and the hot or cool access tiers to optimize your costs based on how frequently your object data is accessed.

On the Storage accounts blade, select Create storage account.

On the Create a storage account blade, in Instance details, in Storage account name, enter sa52259510.

In Region, ensure that (US) East US is selected.

In Redundancy, select Locally-redundant storage (LRS), and then select Next


Create a storage account - Micr
https://portal.azure.com/#create/Microsoft.StorageAccount
Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Storage accounts >
Previous
Next
Review + create
Give feedback
Type here to search
3:54 PM
6/16/2025

Create a storage account

Subscription * Challenge Labs 04

Resource group * corp-datalod52259510

Create new

Instance details

Storage account name * sa52259510

Region * (US) East US

Deploy to an Azure Extended Zone

Primary service: Select a primary service

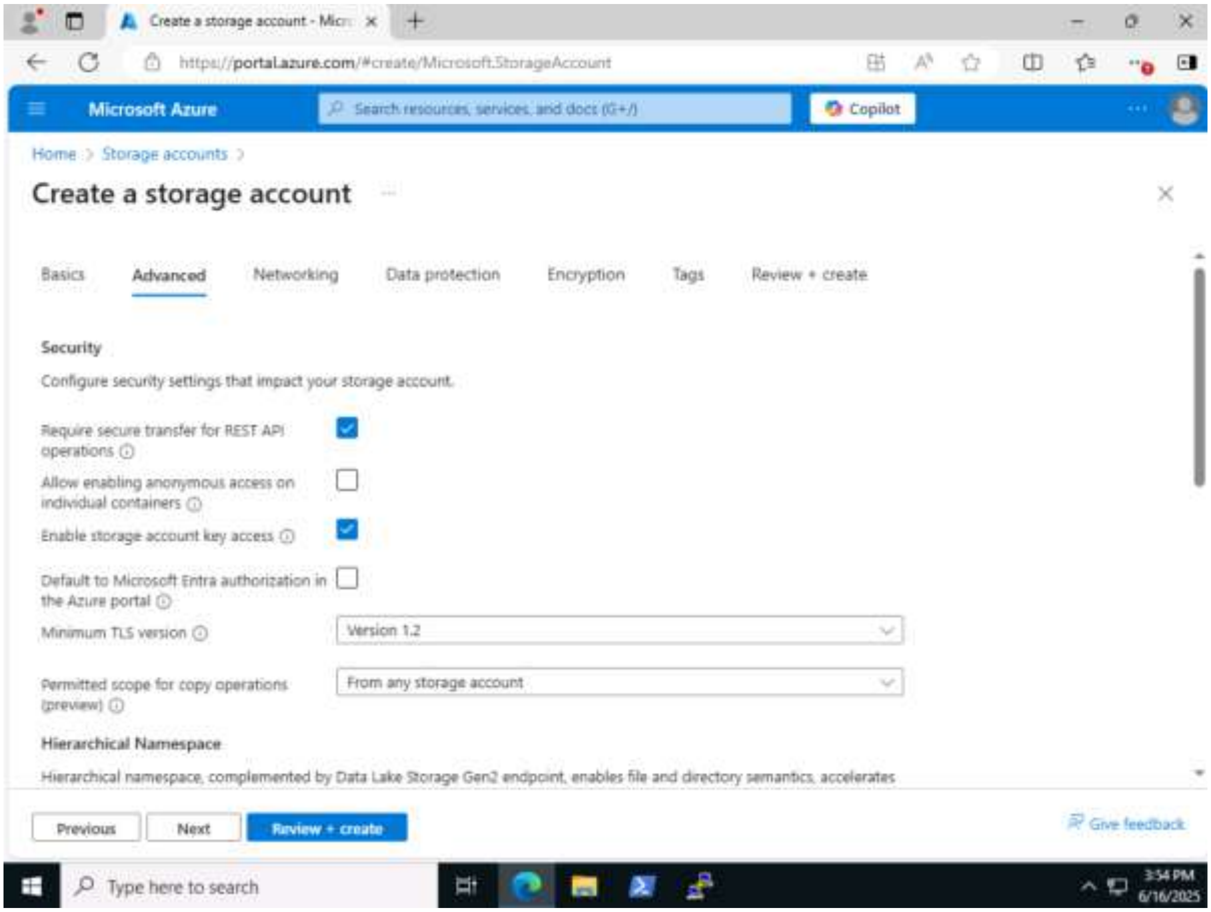
Performance *

● **Standard:** Recommended for most scenarios (general-purpose v2 account)

○ **Premium:** Recommended for scenarios that require low latency.

Redundancy * Locally-redundant storage (LRS)

On the Advanced page, in Security, ensure that the Require secure transfer for REST API operations checkbox is selected.


Create a storage account - Micr
https://portal.azure.com/#create/Microsoft.StorageAccount
Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Storage accounts >

Create a storage account

Basics
Advanced
Networking
Data protection
Encryption
Tags
Review + create

Security

Configure security settings that impact your storage account.

Require secure transfer for REST API operations ☑

Allow enabling anonymous access on individual containers □

Enable storage account key access ☑

Default to Microsoft Entra authorization in the Azure portal □

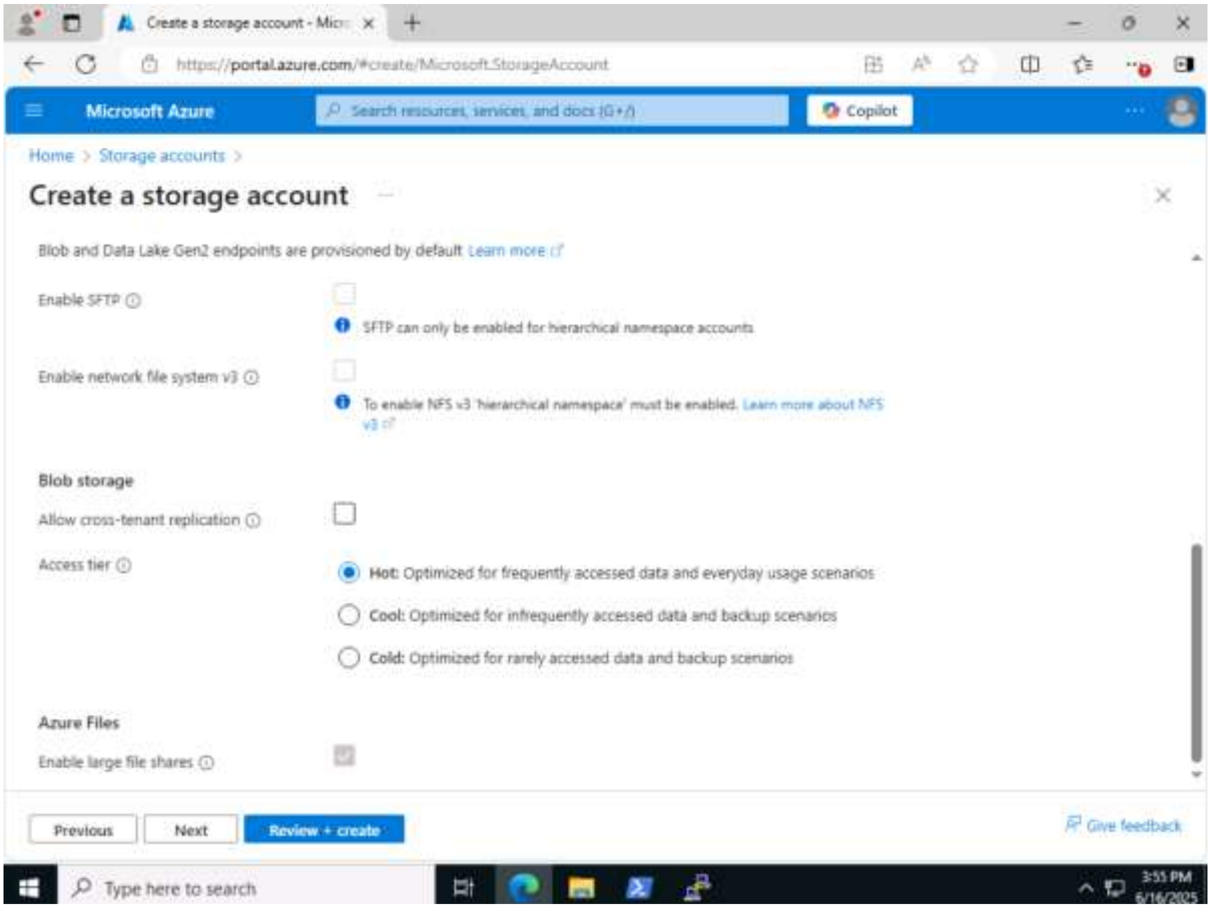
Minimum TLS version: Version 1.2

Permitted scope for copy operations (preview): From any storage account

Hierarchical Namespace

Hierarchical namespace, complemented by Data Lake Storage Gen2 endpoint, enables file and directory semantics, accelerates

In Blob storage, in Access tier, ensure that Hot: Optimized for frequently accessed data and everyday usage scenarios is selected.


Create a storage account - Micr
https://portal.azure.com/#create/Microsoft.StorageAccount
Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > Storage accounts >

Create a storage account

Blob and Data Lake Gen2 endpoints are provisioned by default Learn more

Enable SFTP □

SFTP can only be enabled for hierarchical namespace accounts

Enable network file system v3 □

To enable NFS v3 'hierarchical namespace' must be enabled. Learn more about NFS v3

Blob storage

Allow cross-tenant replication □

Access tier

● Hot: Optimized for frequently accessed data and everyday usage scenarios

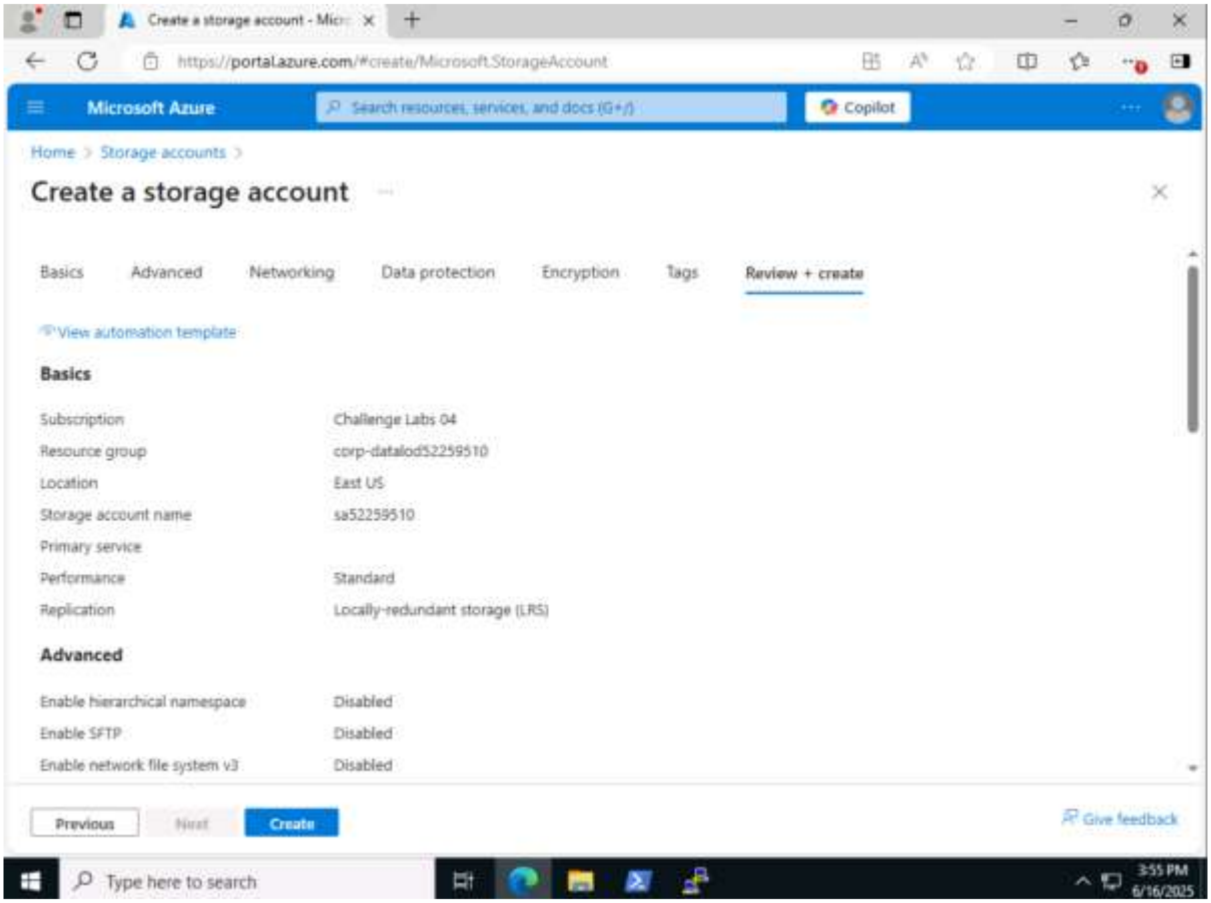
○ Cool: Optimized for infrequently accessed data and backup scenarios

○ Cold: Optimized for rarely accessed data and backup scenarios

Azure Files

Enable large file shares ☑

Select Review, and then select Create.



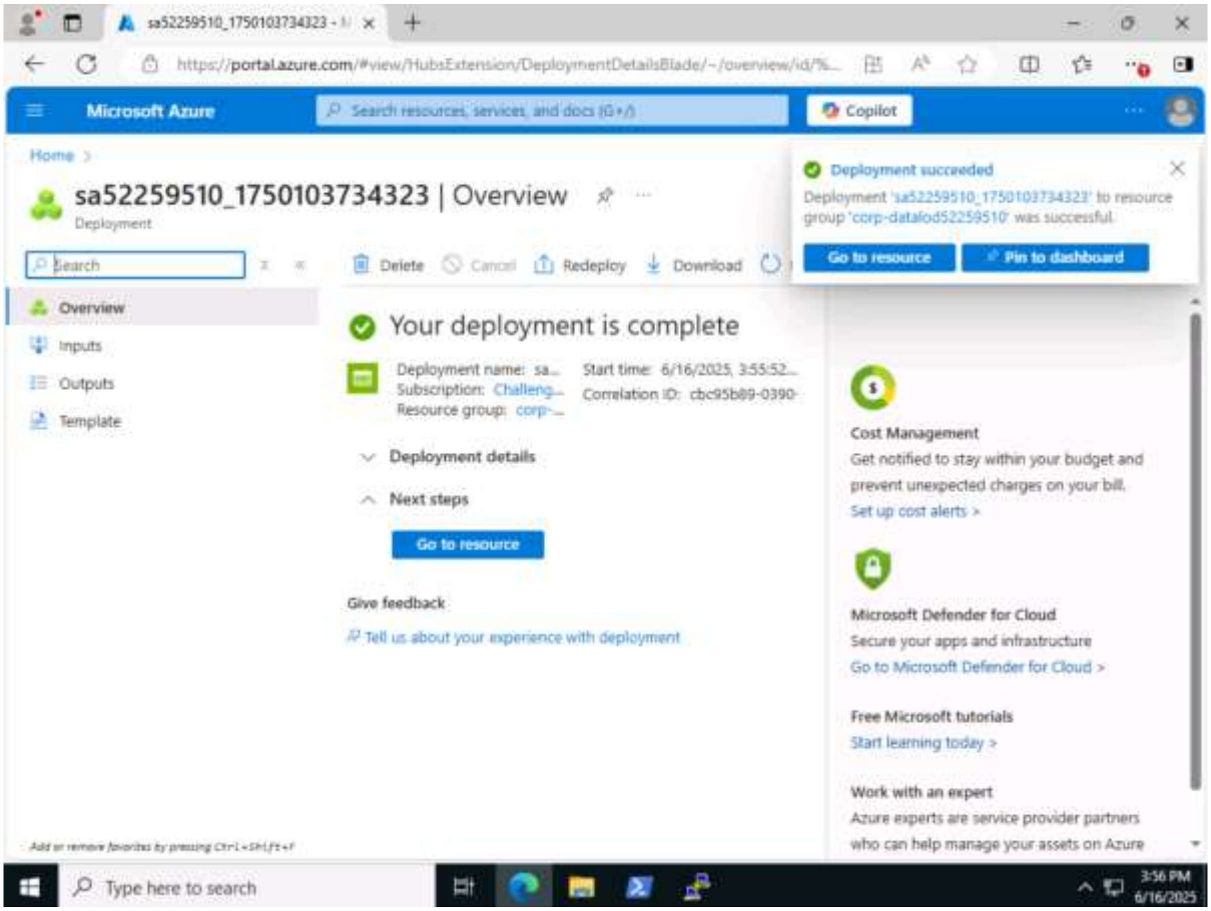
Create a storage account

Basics

Subscription	Challenge Labs 04
Resource group	corp-datalod52259510
Location	East US
Storage account name	sa52259510
Primary service	
Performance	Standard
Replication	Locally-redundant storage (LRS)

Advanced

Enable hierarchical namespace	Disabled
Enable SFTP	Disabled
Enable network file system v3	Disabled


sa52259510_1750103734323 - M
https://portal.azure.com/#view/HubsExtension/DeploymentDetailsBlade/~/overview/id/%...
Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home >
Search
Overview
Inputs
Outputs
Template
Delete
Cancel
Redeploy
Download
Go to resource
Pin to dashboard
Add or remove favorites by pressing Ctrl+Shift+F
Type here to search
3:56 PM
6/16/2025

sa52259510_1750103734323 | Overview

Deployment

Deployment succeeded

Deployment 'sa52259510_1750103734323' to resource group 'corp-datalod52259510' was successful.

Your deployment is complete

Deployment name: sa...
Subscription: Challeng...
Resource group: corp-...
Start time: 6/16/2025, 3:55:52...
Correlation ID: cbc95b89-0390-

Deployment details

Next steps

Go to resource

Give feedback

Tell us about your experience with deployment

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

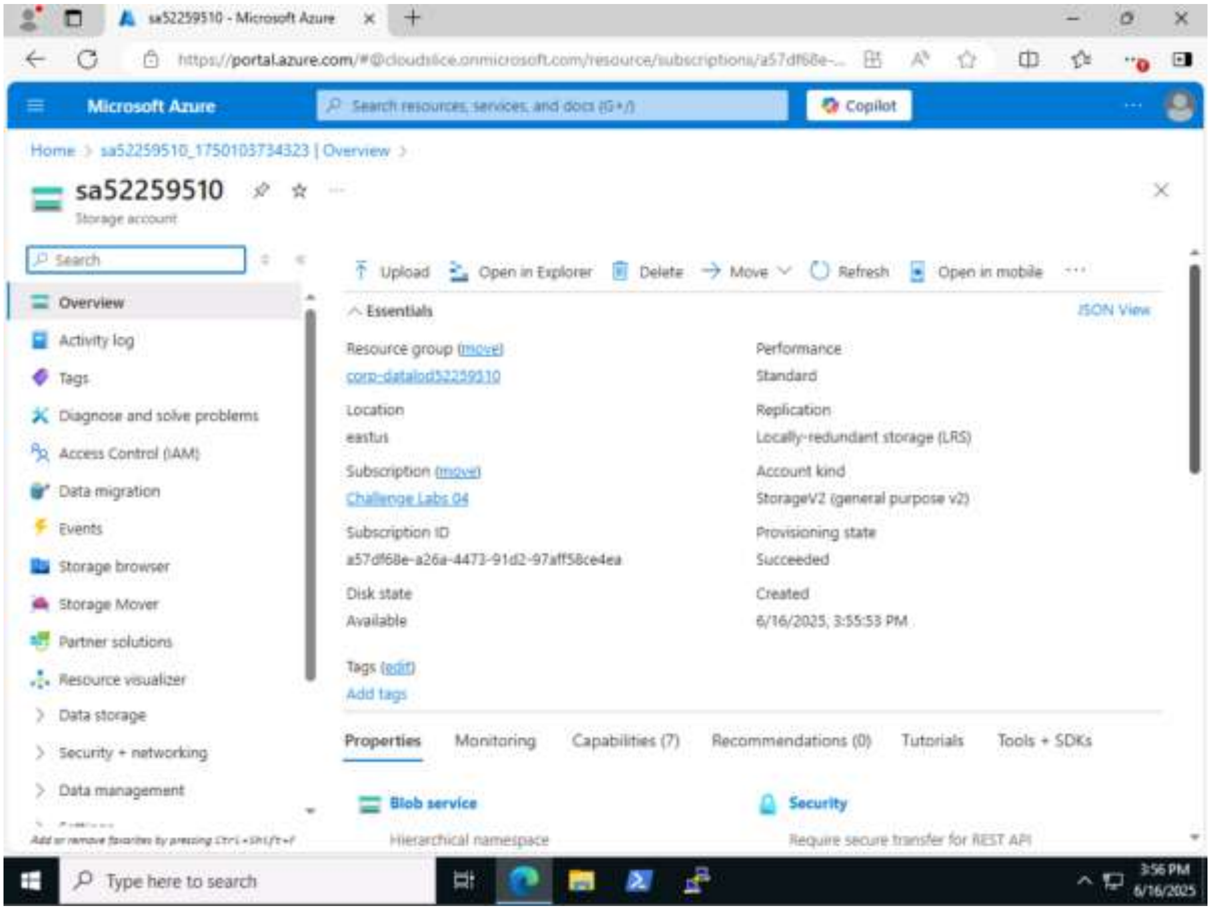
Start learning today >

Work with an expert

Azure experts are service provider partners who can help manage your assets on Azure

- Create a blob container named images that has a Public access level of Private (no anonymous access) and then upload the C:\Windows\blue-gray.jpg file to the blob container.

On the Deployment blade, select Go to resource.



Essentials

Resource group (move)
corp-datalod52259510

Location
eastus

Subscription (move)
Challenge Labs 04

Subscription ID
a57df68e-a26a-4473-91d2-97aff58ce4ea

Disk state
Available

Tags (edit)
Add tags

Performance
Standard

Replication
Locally-redundant storage (LRS)

Account kind
StorageV2 (general purpose v2)

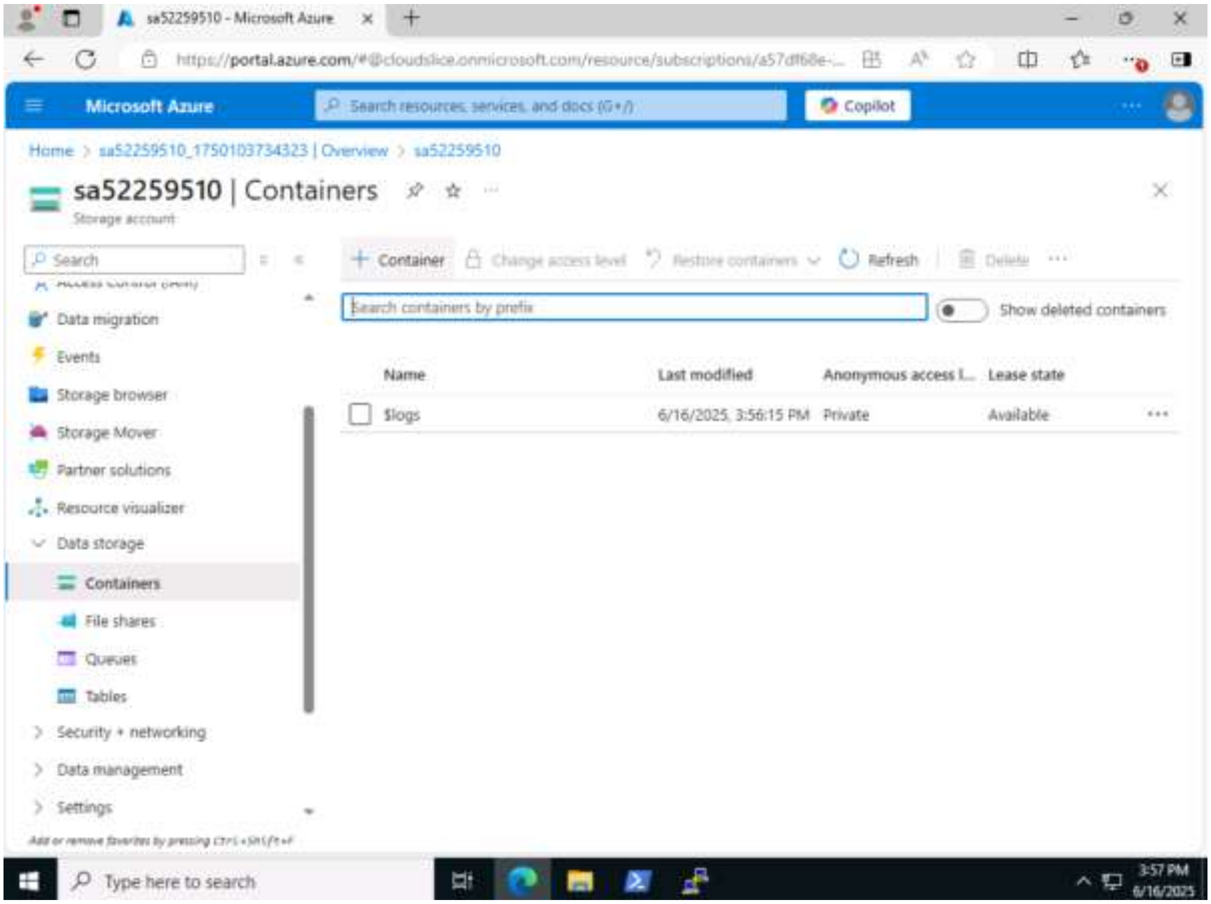
Provisioning state
Succeeded

Created
6/16/2025, 3:55:53 PM

Hierarchical namespace

Require secure transfer for REST API

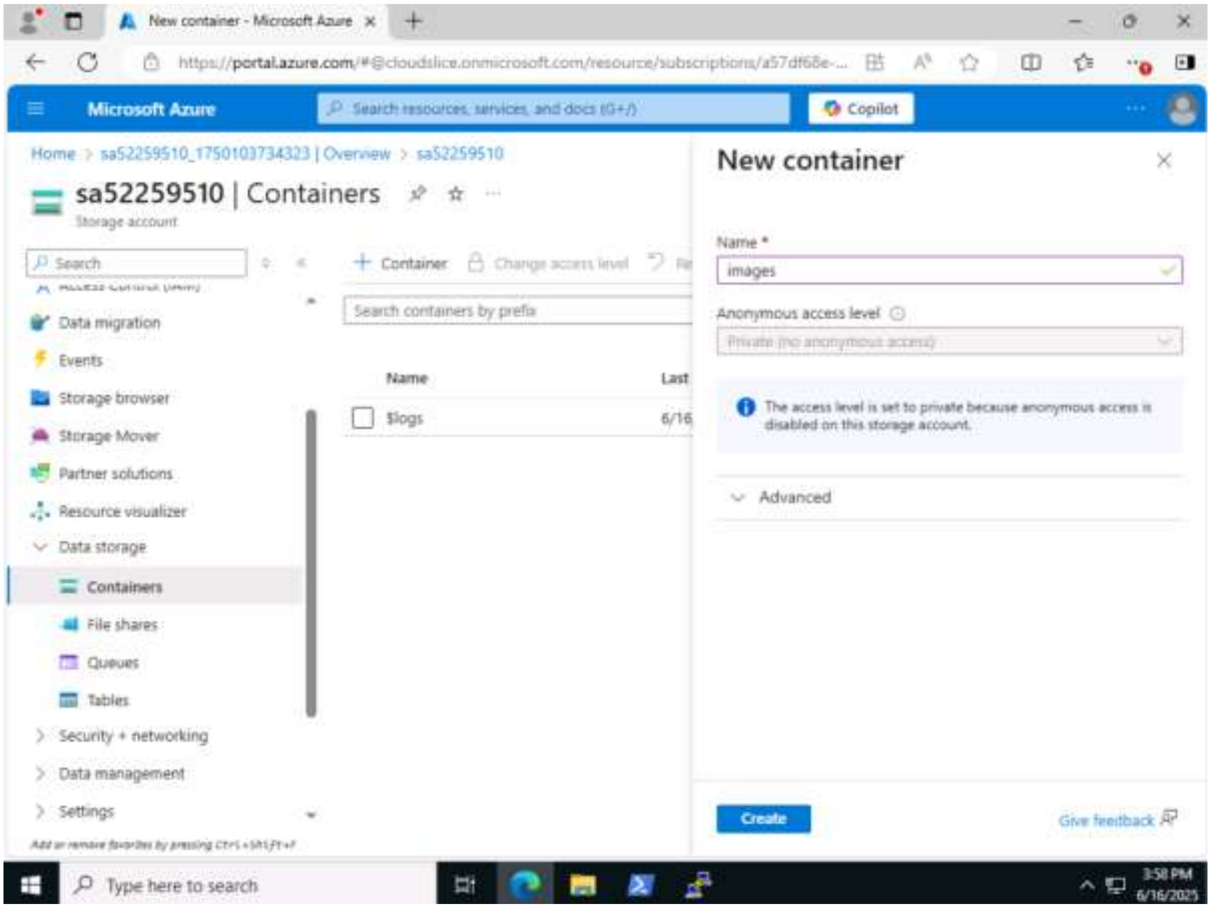
On the sa52259510 service menu, in Data storage, select Containers.



Name	Last modified	Anonymous access l...	Lease state
$logs	6/16/2025, 3:56:15 PM	Private	Available

On the Containers page, on the command bar, select + Container.

On the New container blade, in Name, enter images, and then select Create.



New container

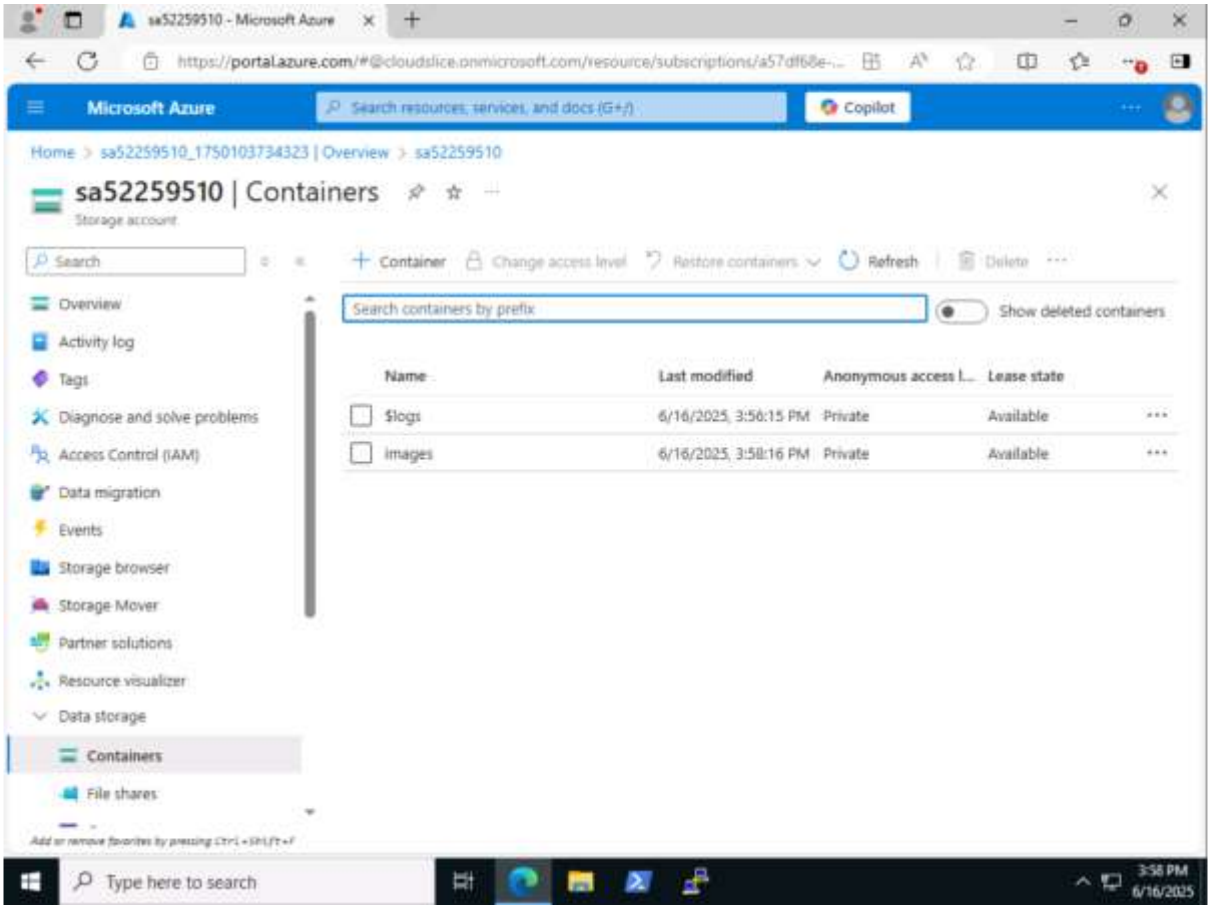
Name *
images

Anonymous access level
Private (no anonymous access)

The access level is set to private because anonymous access is disabled on this storage account.

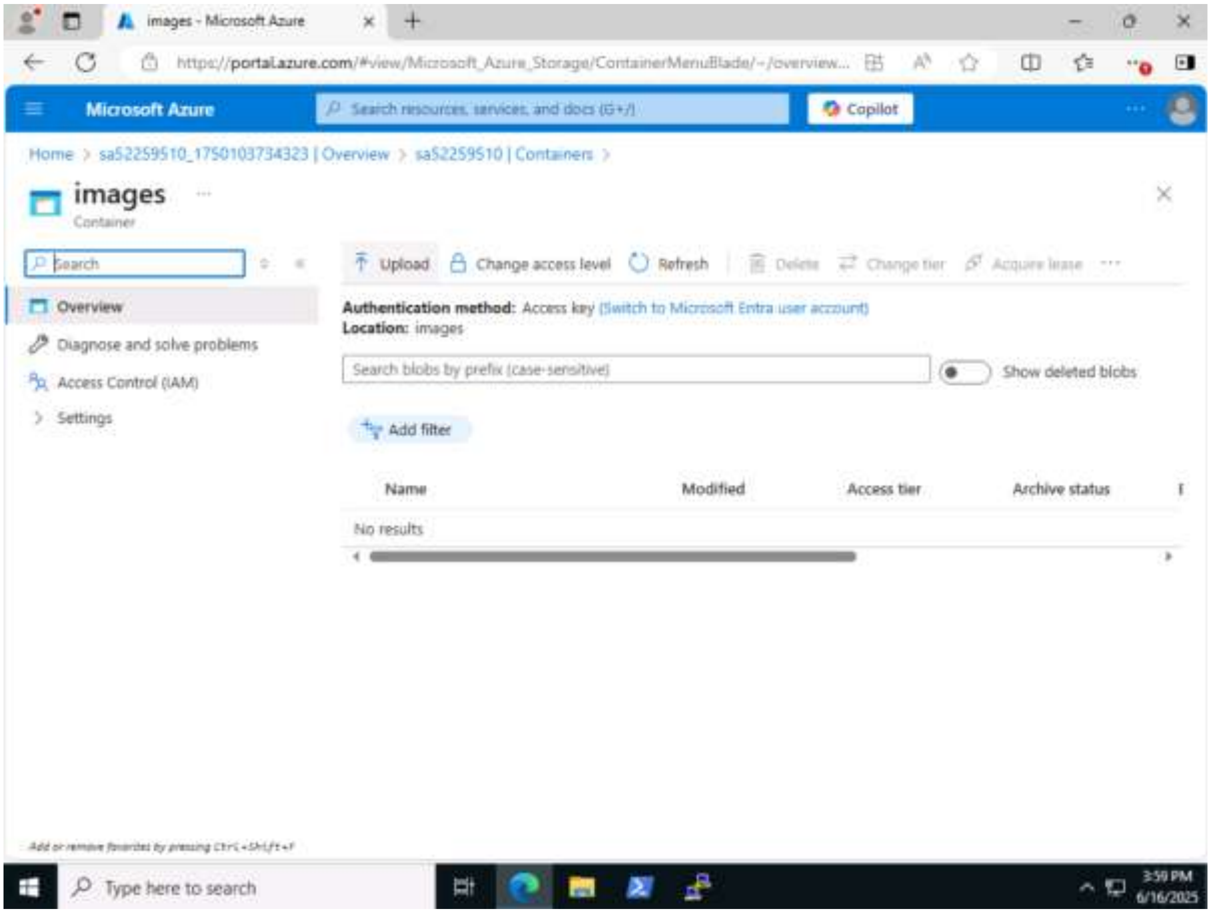
Advanced

On the Containers page, select images.



Name	Last modified	Anonymous access l...	Lease state
$logs	6/16/2025, 3:56:15 PM	Private	Available
images	6/16/2025, 3:58:16 PM	Private	Available

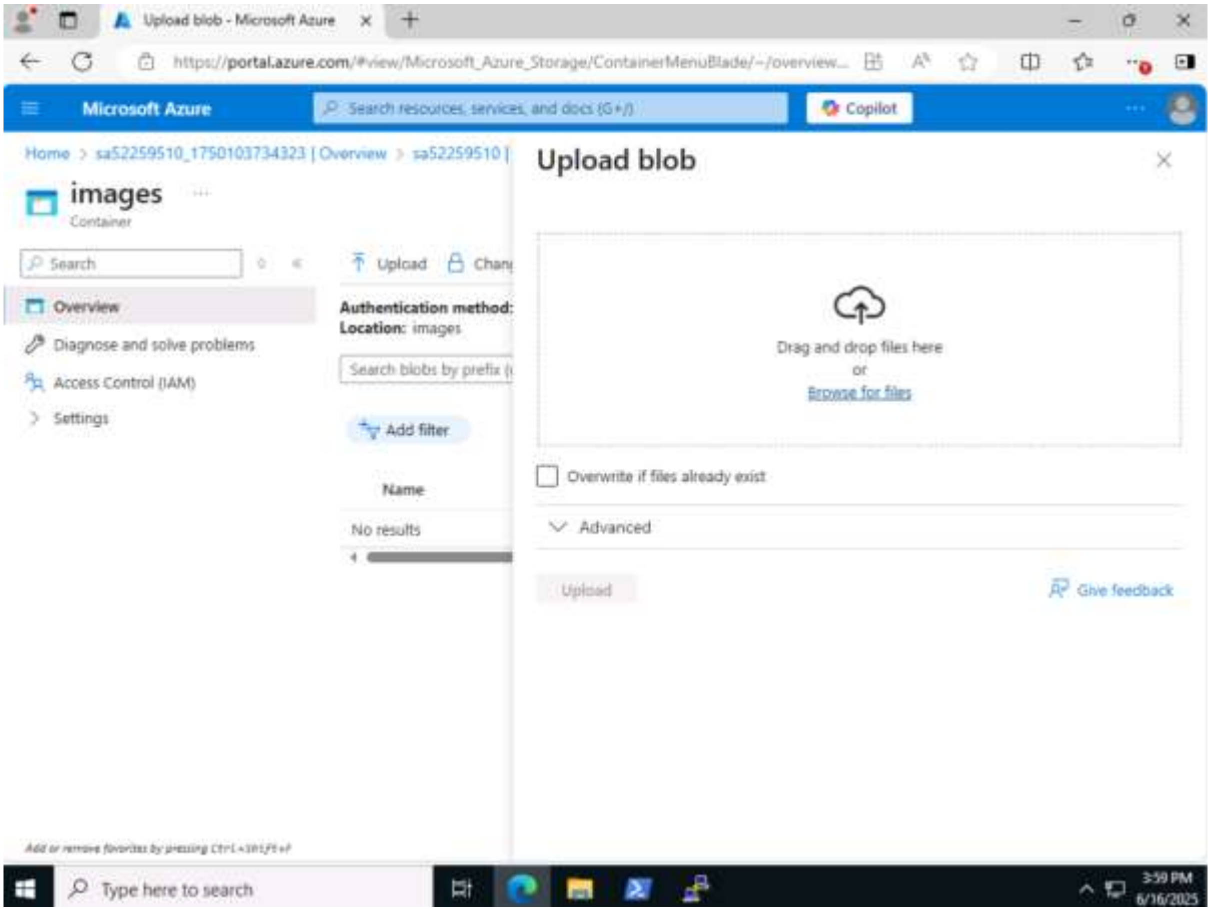
On the images blade, select Upload.


images - Microsoft Azure
https://portal.azure.com/#view/Microsoft_Azure_Storage/ContainerMenuBlade/~/overview...
Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > sa52259510_1750103734323 | Overview > sa52259510 | Containers >
images
Container
Search
Overview
Diagnose and solve problems
Access Control (IAM)
Settings
Upload
Change access level
Refresh
Delete
Change tier
Acquire lease
Search blobs by prefix (case-sensitive)
Show deleted blobs
Add filter
Name
Modified
Access tier
Archive status
Add or remove favorites by pressing Ctrl+Shift+F
Type here to search
3:59 PM
6/16/2025

Authentication method: Access key (Switch to Microsoft Entra user account)
Location: images

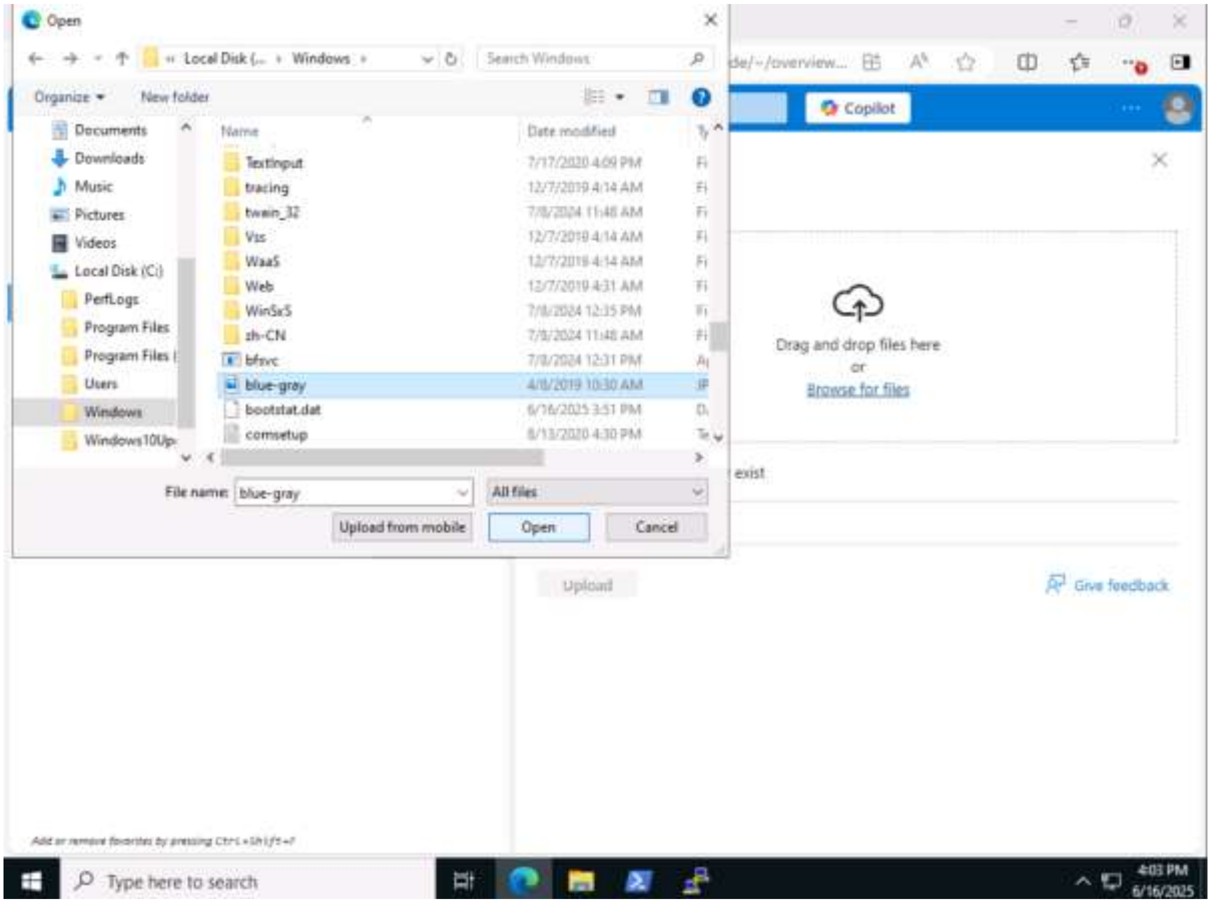
No results

On the Upload blob blade, select Browse for files.



In the Open dialog, browse to the C:\Windows folder.

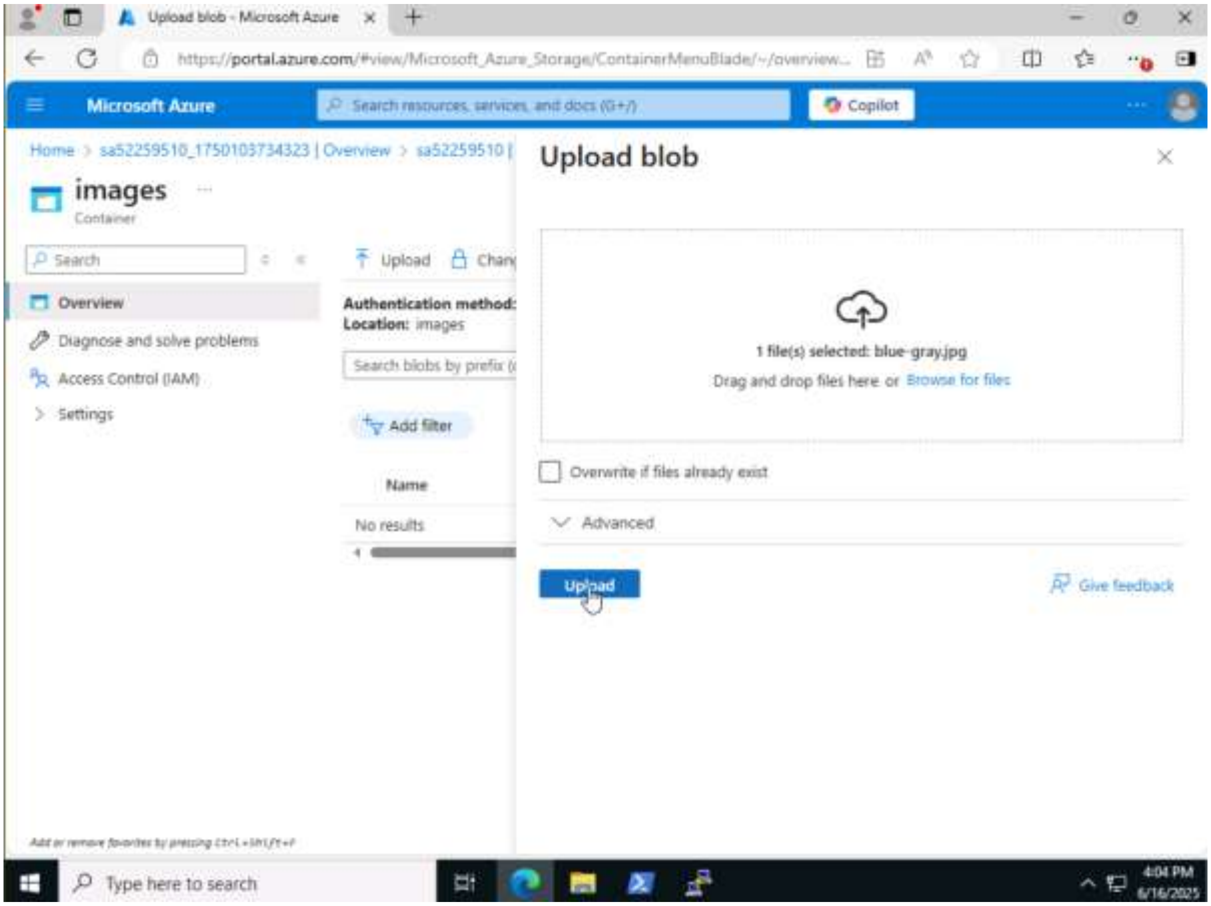
Select blue-gray.jpg, and then select Open.

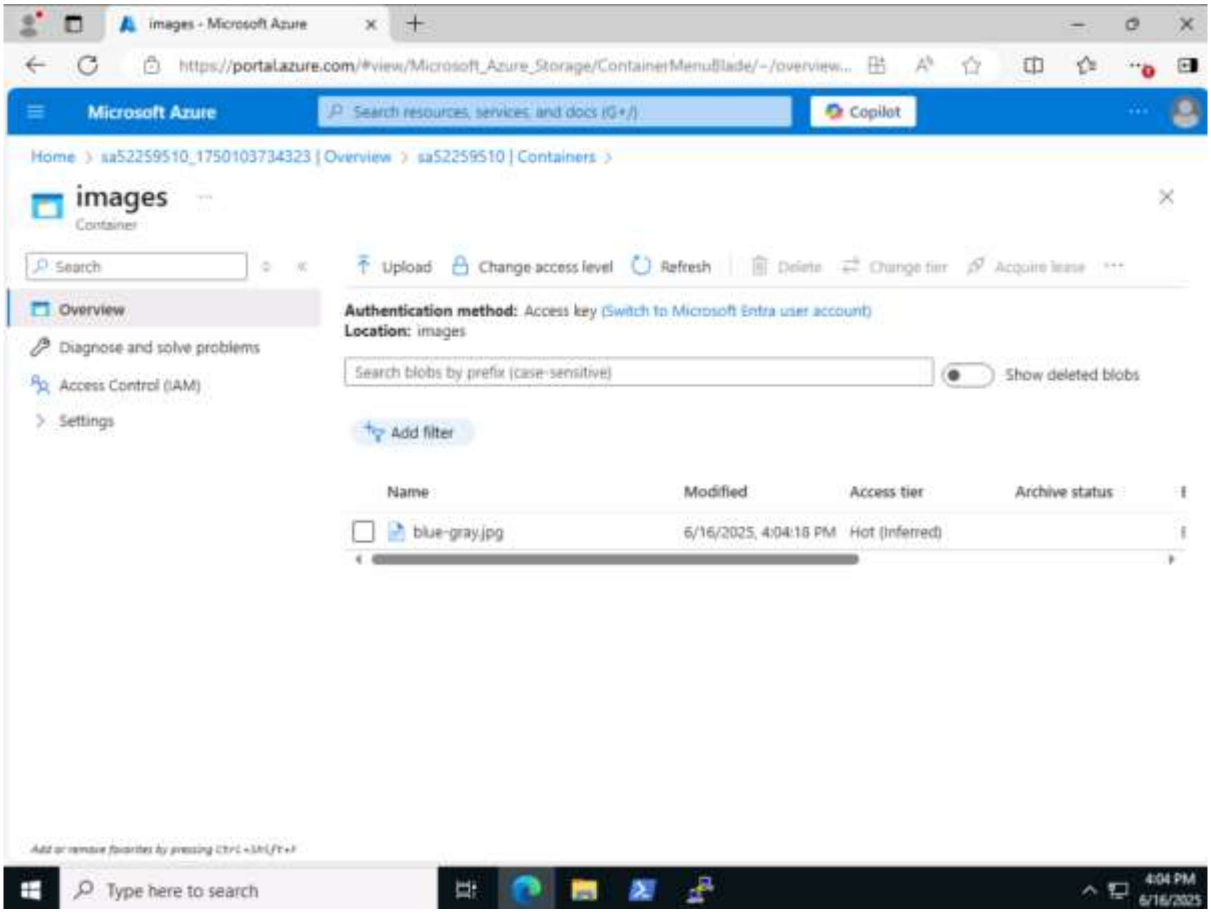


File name: blue-gray

All files

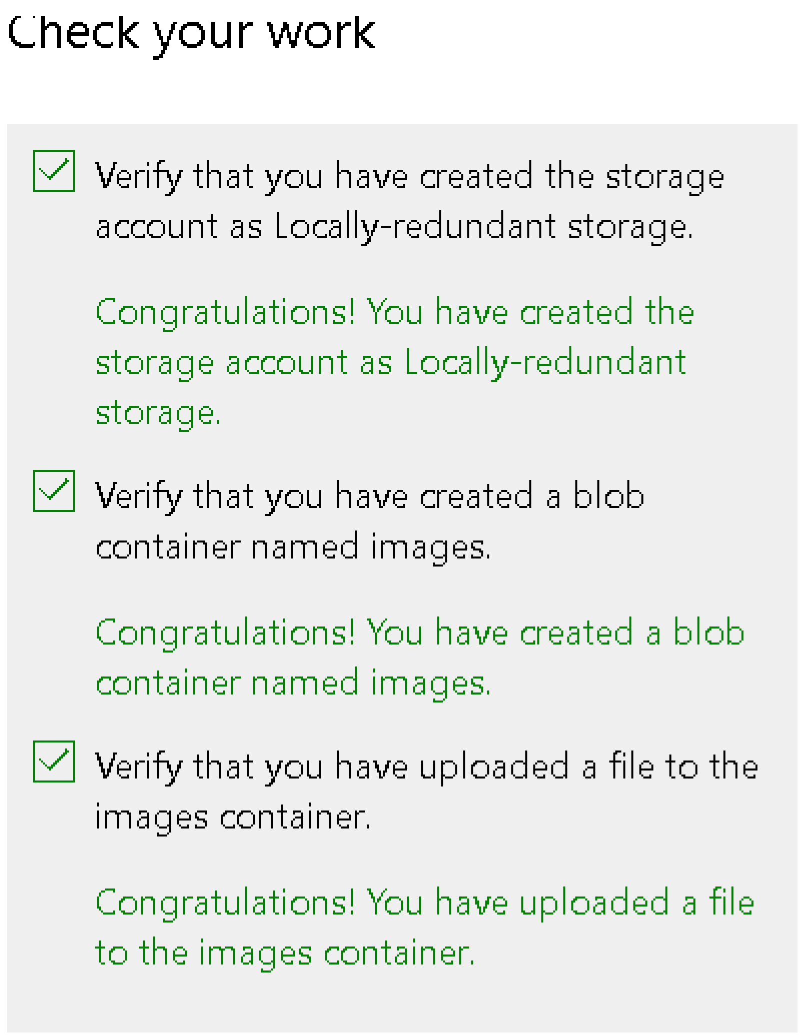
On the Upload blob blade, select Upload.

 Upload blob - Microsoft Azure
https://portal.azure.com/#view/Microsoft_Azure_Storage/ContainerMenuBlade/~/overview...
Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > sa52259510_1750103734323 | Overview > sa52259510 |
images
Container
Search
Overview
Diagnose and solve problems
Access Control (IAM)
Settings
Upload
Chang
Authentication method:
Location: images
Search blobs by prefix (
Add filter
Name
No results
Upload blob
1 file(s) selected: blue-gray.jpg
Drag and drop files here or Browse for files
□ Overwrite if files already exist
Advanced
Upload
Give feedback
Type here to search
4:04 PM
6/16/2025


images - Microsoft Azure
https://portal.azure.com/#view/Microsoft_Azure_Storage/ContainerMenuBlade/~/overview...
Microsoft Azure
Search resources, services, and docs (G+/)
Copilot
Home > sa52259510_1750103734323 | Overview > sa52259510 | Containers >
images
Container
Search
Overview
Diagnose and solve problems
Access Control (IAM)
Settings
Upload
Change access level
Refresh
Delete
Change tier
Acquire lease
Search blobs by prefix (case-sensitive)
Show deleted blobs
Add filter
Add or remove favorites by pressing Ctrl+Shift+F
Type here to search
4:04 PM
6/16/2025

Authentication method: Access key (Switch to Microsoft Entra user account)
Location: images

Name	Modified	Access tier	Archive status
□ blue-gray.jpg	6/16/2025, 4:04:18 PM	Hot (Inferred)	



Check your work

☑ Verify that you have created the storage account as Locally-redundant storage.

Congratulations! You have created the storage account as Locally-redundant storage.

☑ Verify that you have created a blob container named images.

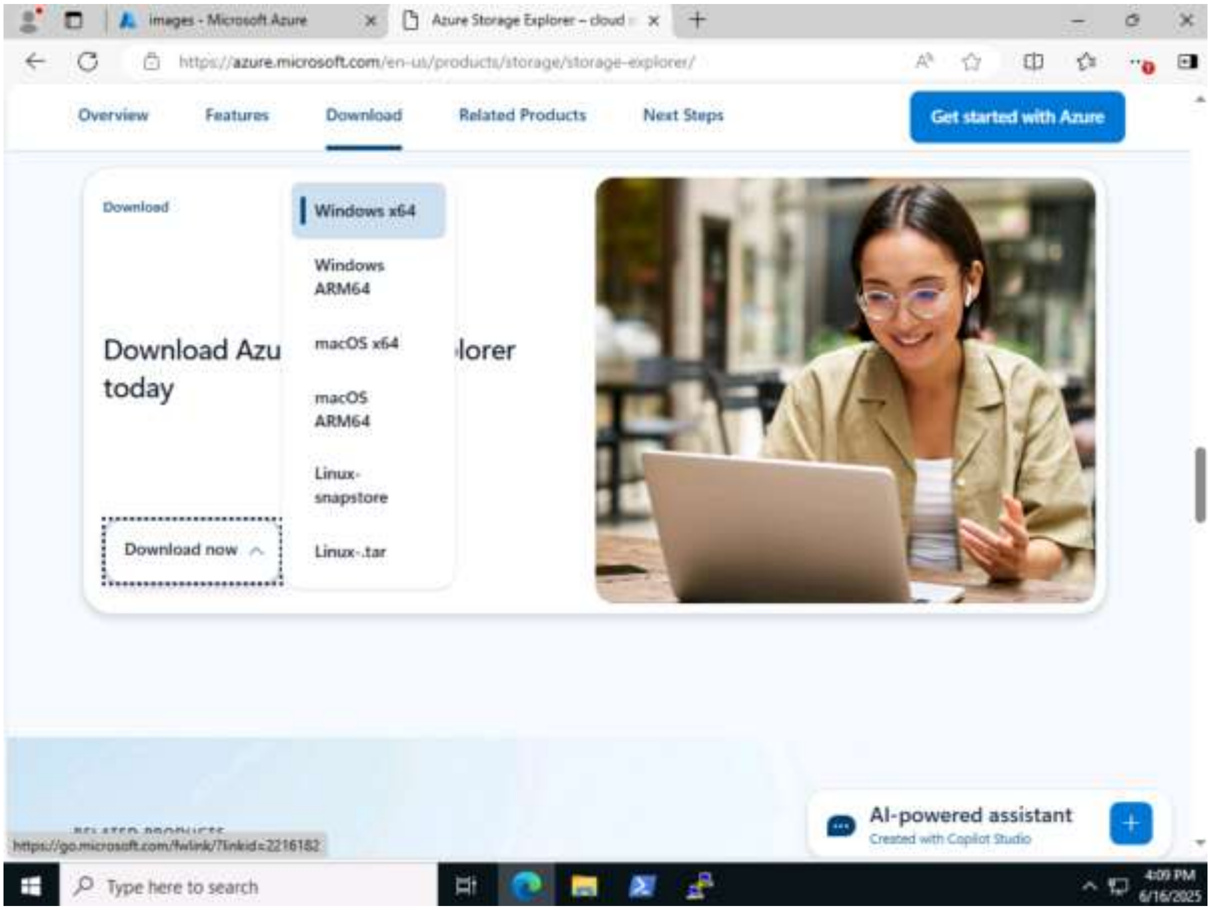
Congratulations! You have created a blob container named images.

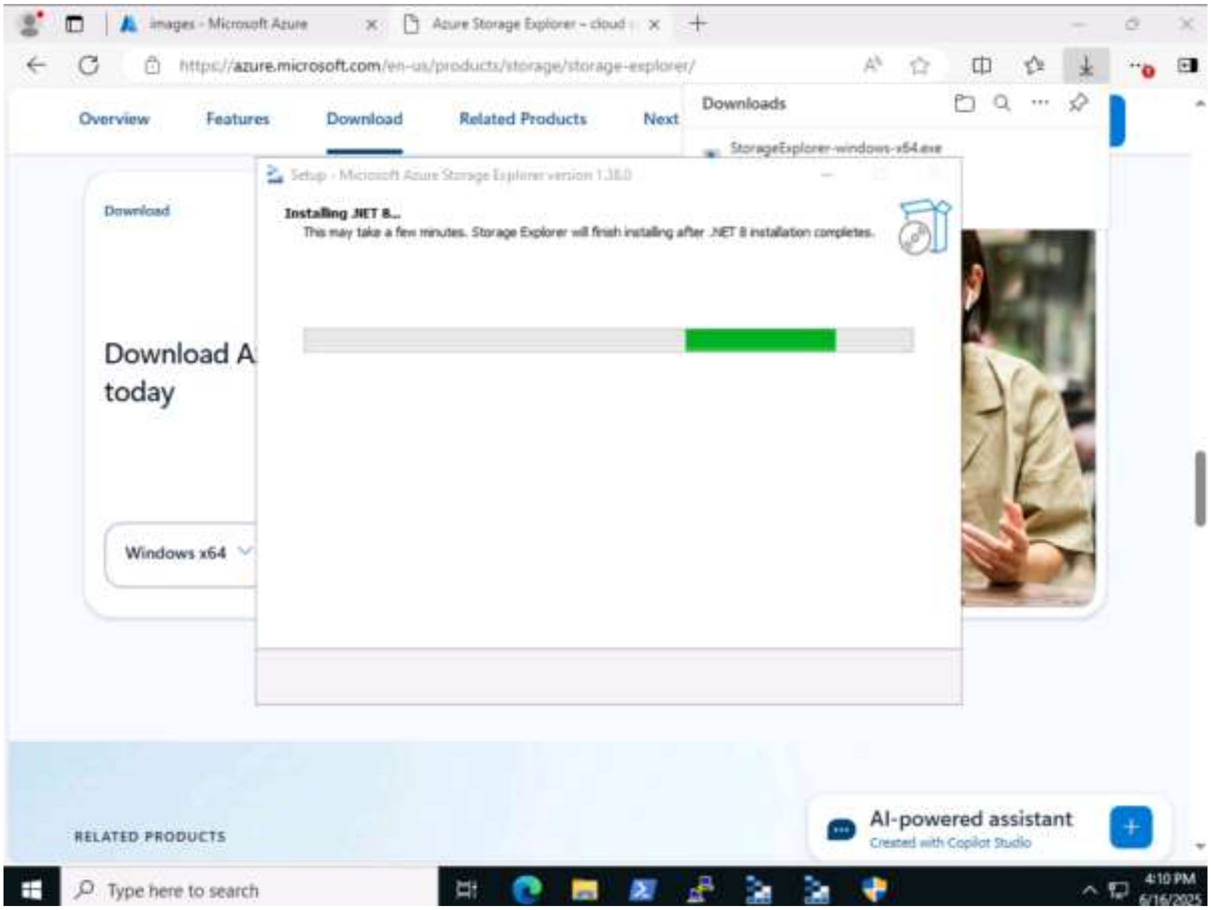
☑ Verify that you have uploaded a file to the images container.

Congratulations! You have uploaded a file to the images container.

- Install Azure Storage Explorer

Open a new Microsoft Edge browser tab, go to https://azure.microsoft.com/en-us/features/storage-explorer/, and then download and install Azure Storage Explorer for Windows x64 using the default options.


images - Microsoft Azure
Azure Storage Explorer – cloud
https://azure.microsoft.com/en-us/products/storage/storage-explorer/
Overview
Features
Download
Related Products
Next Steps
Get started with Azure
Download
Download Azu
today
lorer
Windows x64
Windows ARM64
macOS x64
macOS ARM64
Linux-snapstore
Linux-.tar
Download now
AI-powered assistant
Created with Copilot Studio
https://go.microsoft.com/fwlink/?linkid=2216182
Type here to search
4:09 PM
6/16/2025

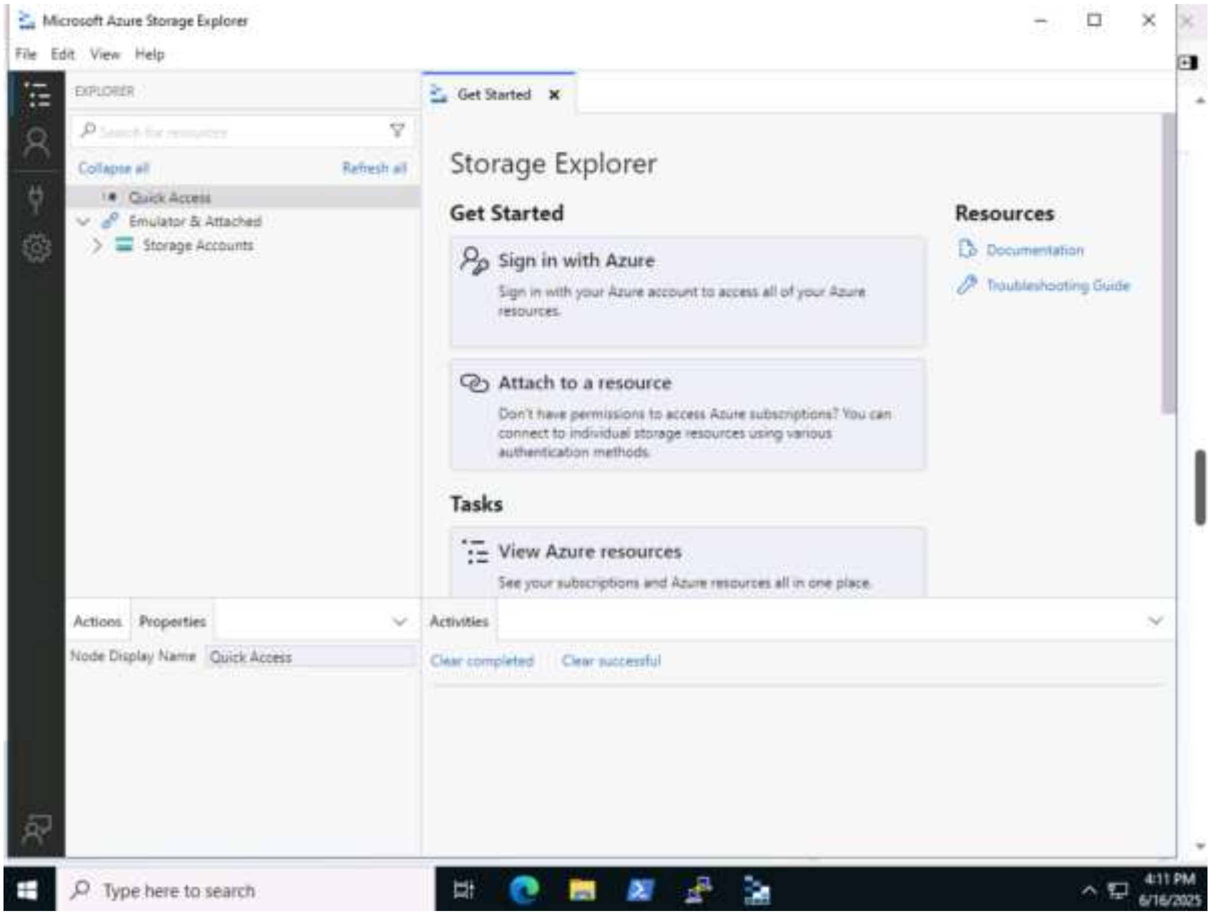


Setup - Microsoft Azure Storage Explorer version 1.38.0

Installing .NET 8...

This may take a few minutes. Storage Explorer will finish installing after .NET 8 installation completes.

Start Storage Explorer.



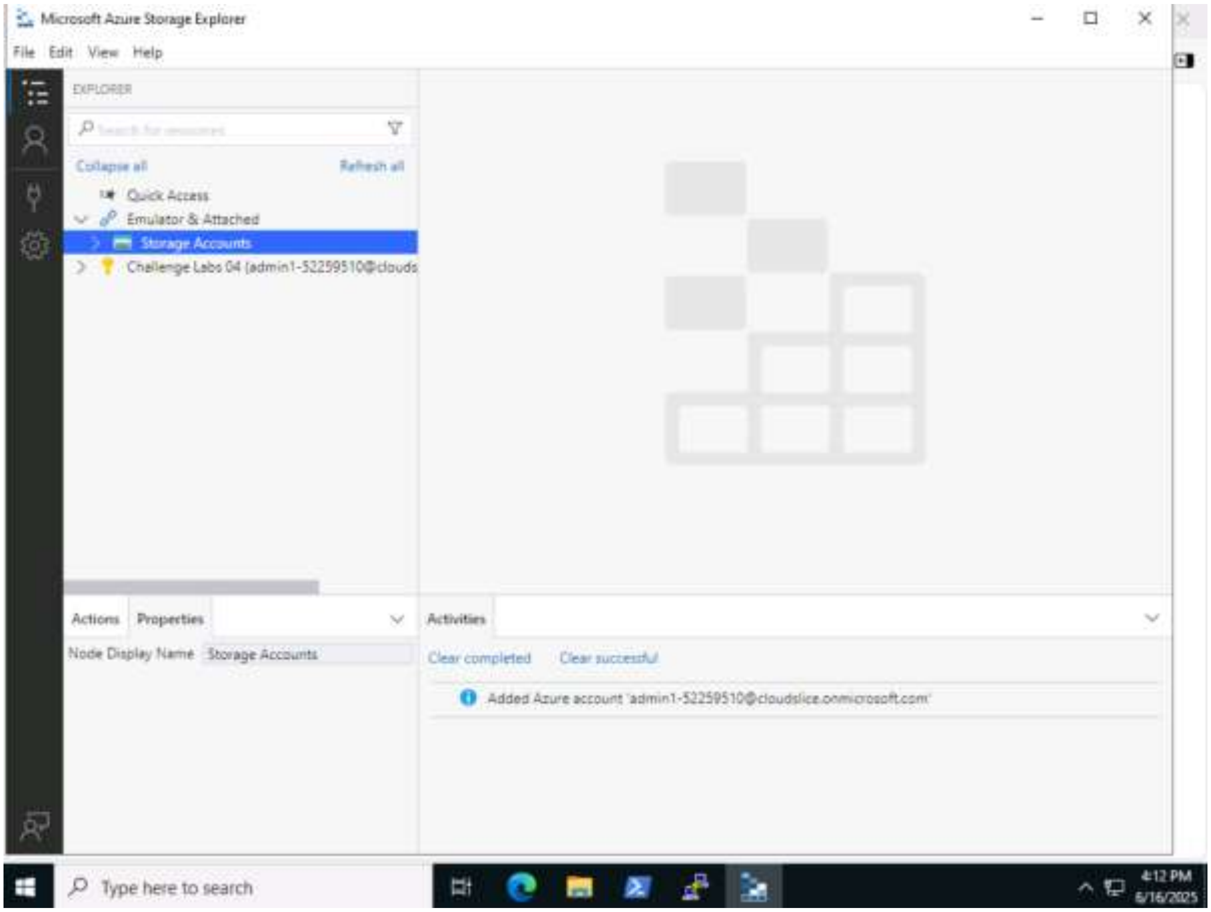
Sign in with your Azure account to access all of your Azure resources.

Don't have permissions to access Azure subscriptions? You can connect to individual storage resources using various authentication methods.

See your subscriptions and Azure resources all in one place.

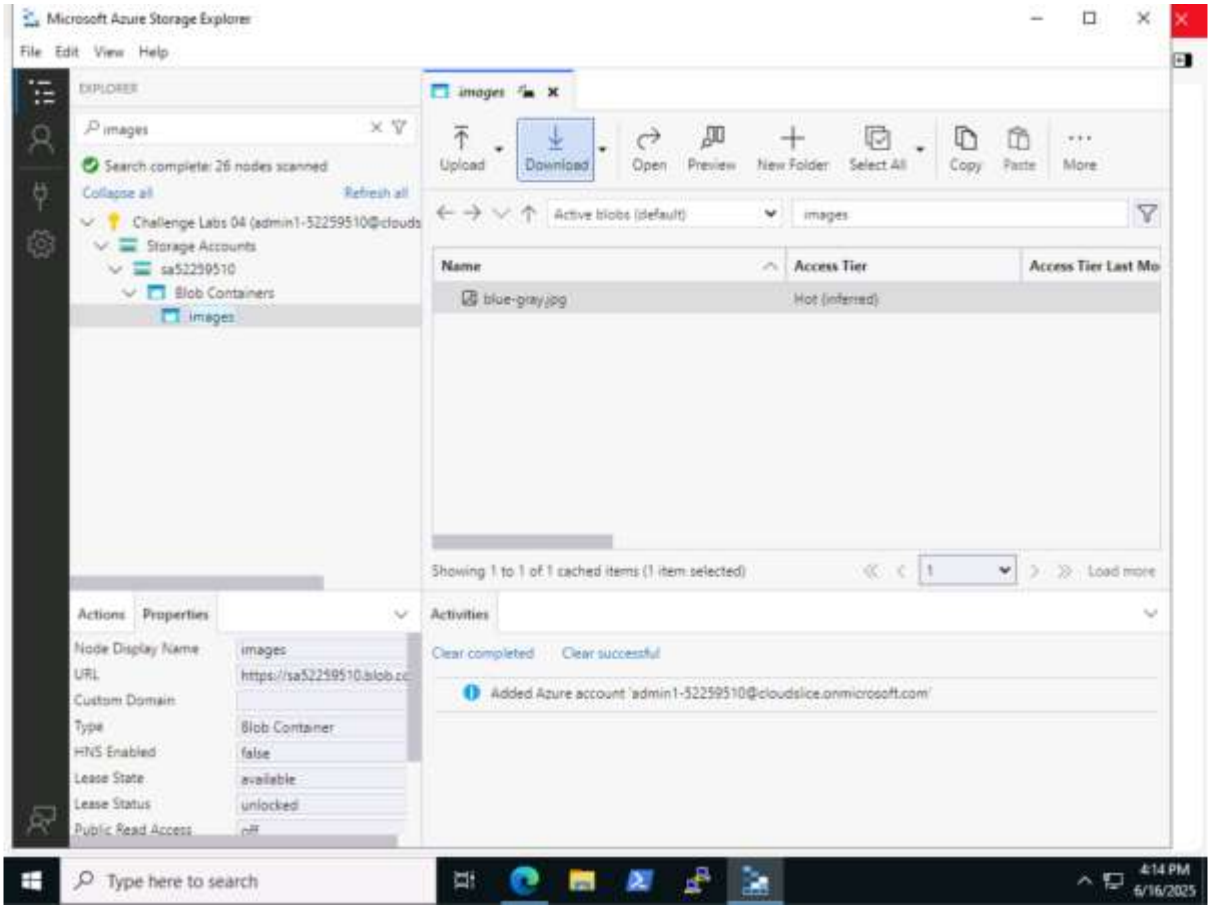
- Browse to the images container within the sa52259510 storage account, download the blob image to a different folder, open the image in the new location to verify valid download and then close the image file.

In the Microsoft Azure Storage Explorer search field, enter images, and then select the images container.



Node Display Name: Storage Accounts

Added Azure account 'admin1-52259510@cloudslice.onmicrosoft.com'



Search complete: 26 nodes scanned

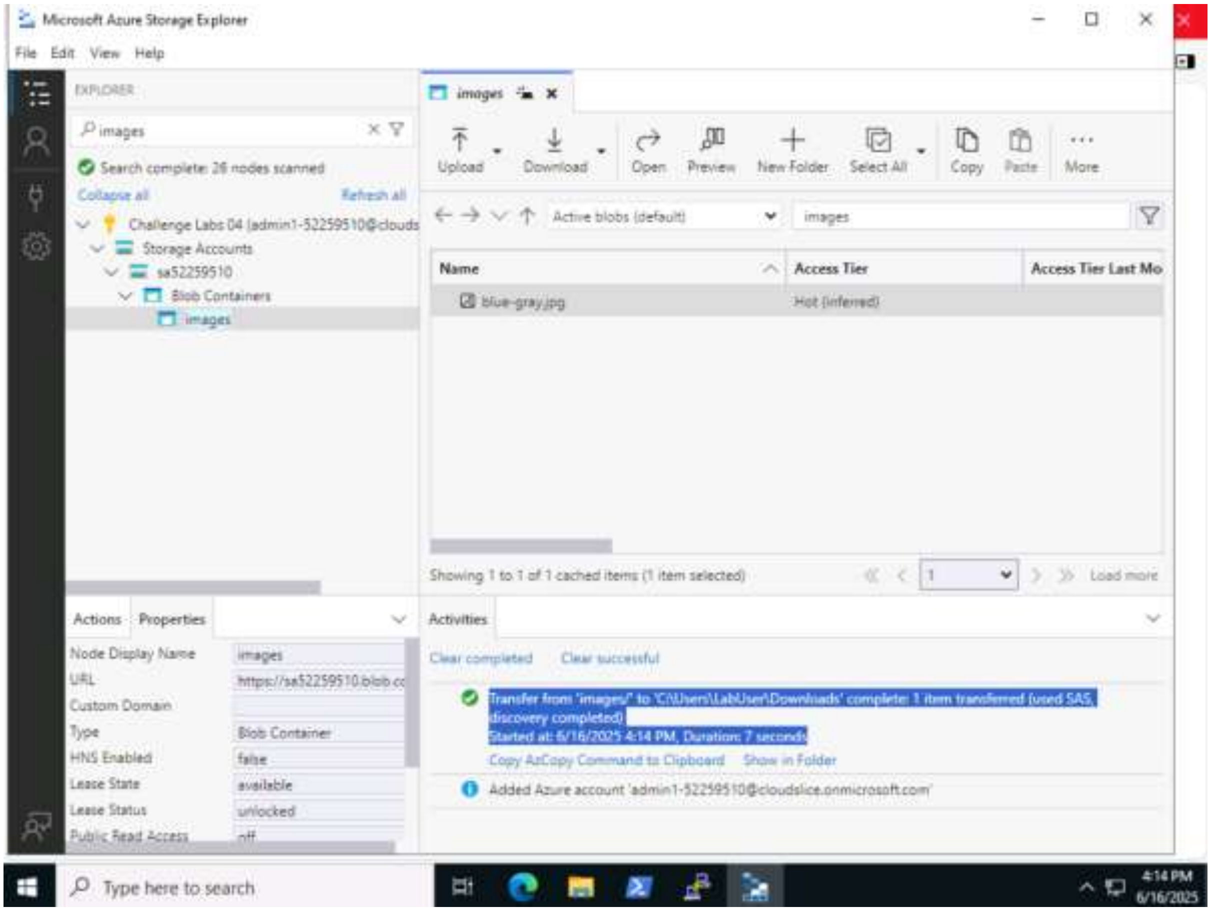
Name	Access Tier	Access Tier Last Mo
blue-gray.jpg	Hot (inferred)	

Showing 1 to 1 of 1 cached items (1 item selected)

Node Display Name	images
URL	https://sa52259510.blob.cc
Custom Domain	
Type	Blob Container
HNS Enabled	false
Lease State	available
Lease Status	unlocked
Public Read Access	off

Added Azure account 'admin1-52259510@cloudslice.onmicrosoft.com'

In the images container, select the image file that you previously uploaded, select Download, and then download the file to a new location.



Search complete: 26 nodes scanned

Name	Access Tier	Access Tier Last Mo
blue-gray.jpg	Hot (inferred)	

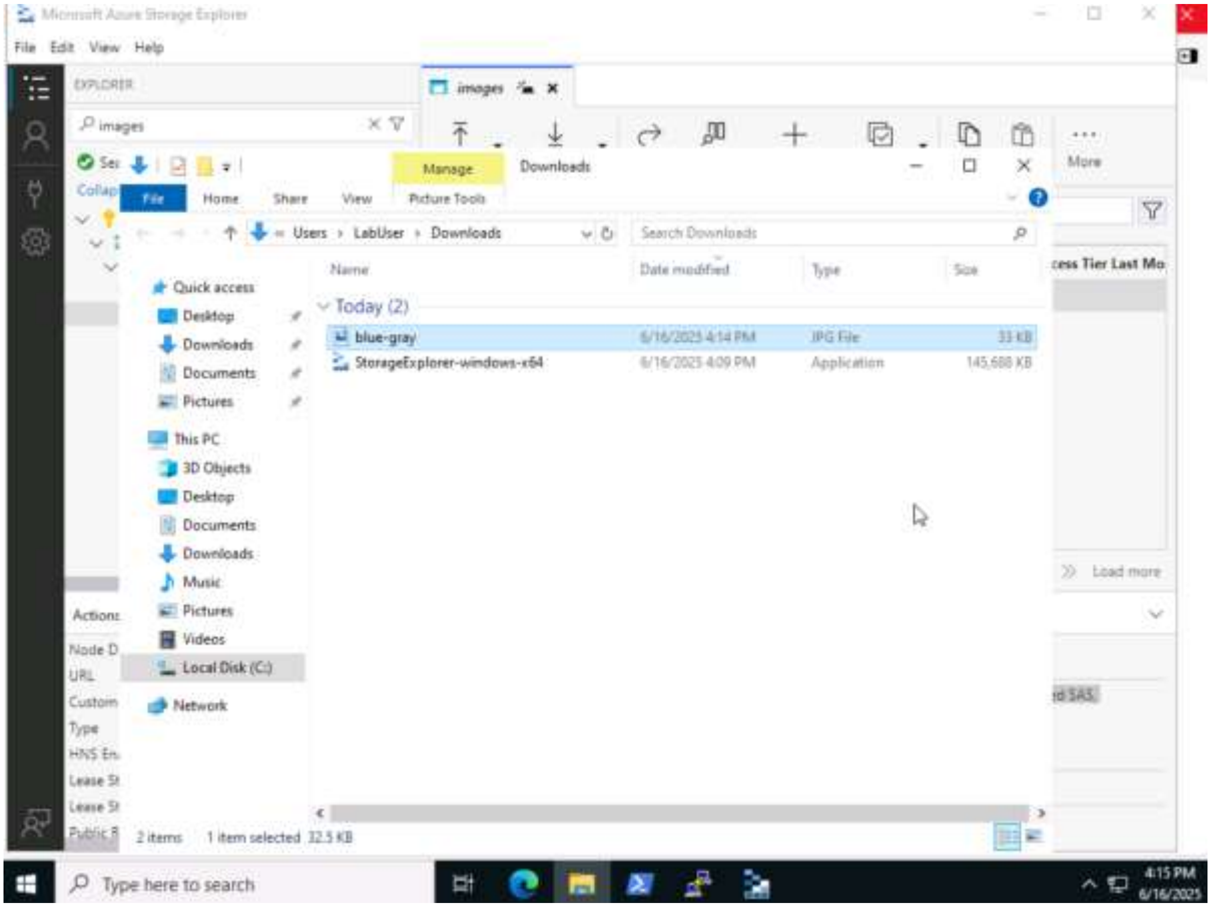
Showing 1 to 1 of 1 cached items (1 item selected)

Node Display Name	images
URL	https://sa52259510.blob.co
Custom Domain	
Type	Blob Container
HNS Enabled	false
Lease State	available
Lease Status	unlocked
Public Read Access	off

Transfer from 'images/' to 'C:\Users\LabUser\Downloads' complete: 1 item transferred (used SAS, discovery completed)
Started at: 6/16/2025 4:14 PM, Duration: 7 seconds

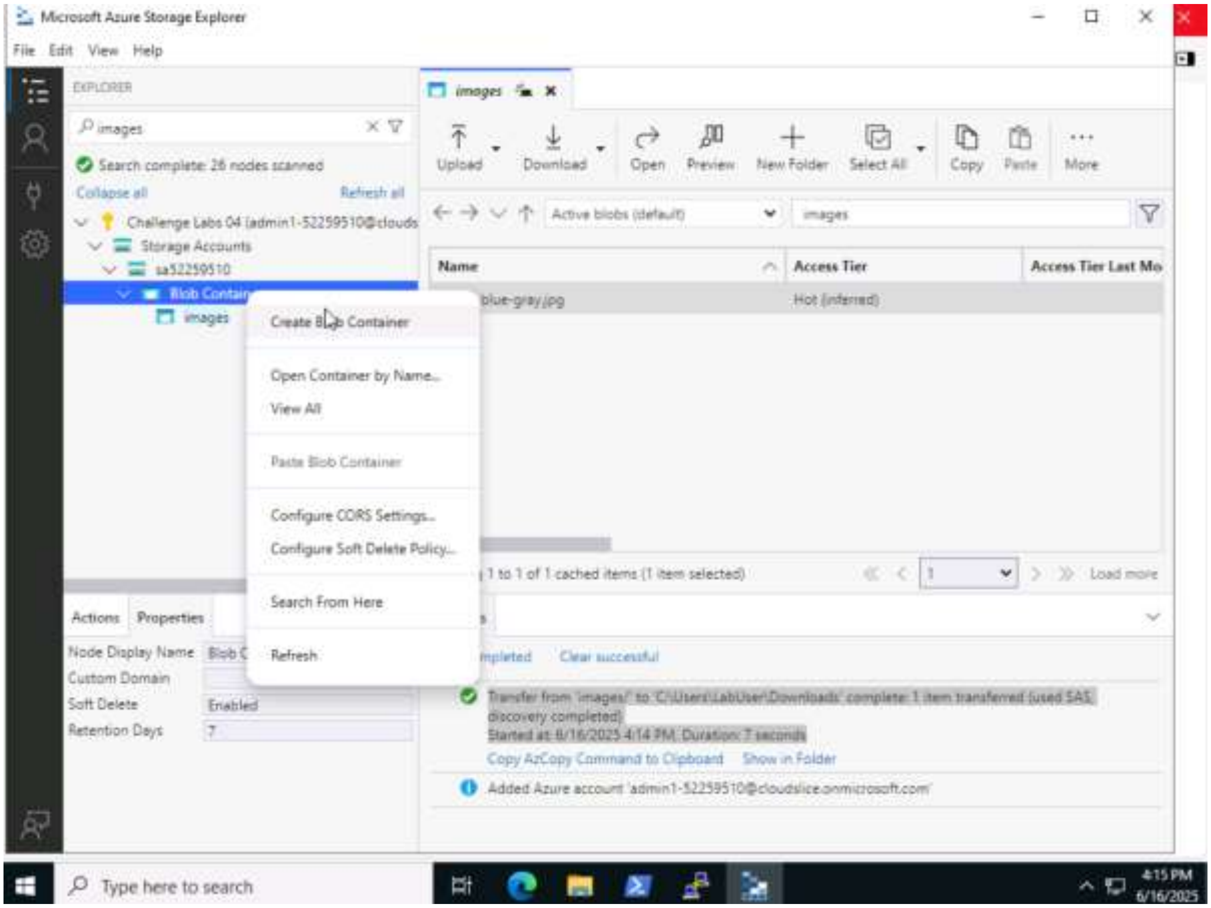
Added Azure account 'admin1-52259510@cloudslice.onmicrosoft.com'

Open the newly downloaded image file to verify the download.


Microsoft Azure Storage Explorer
File Edit View Help
EXPLORER
images
More
Manage
Downloads
File Home Share View Picture Tools
Users › LabUser › Downloads
Search Downloads
Quick access
Desktop
Downloads
Documents
Pictures
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Local Disk (C:)
Network
Name Date modified Type Size
Today (2)
blue-gray 6/16/2025 4:14 PM JPG File 33 KB
StorageExplorer-windows-x64 6/16/2025 4:09 PM Application 145,688 KB
2 items 1 item selected 32.5 KB
Load more
Type here to search
4:15 PM 6/16/2025

- Create a new container named files by using Storage Explorer, and then upload any file to the files container.

In Microsoft Azure Storage Explorer, in sa52259510, right-click Blob Containers, and then select Create Blob Container.



Name	Access Tier	Access Tier Last Mo
blue-gray.jpg	Hot (inferred)	

Showing 1 to 1 of 1 cached items (1 item selected)

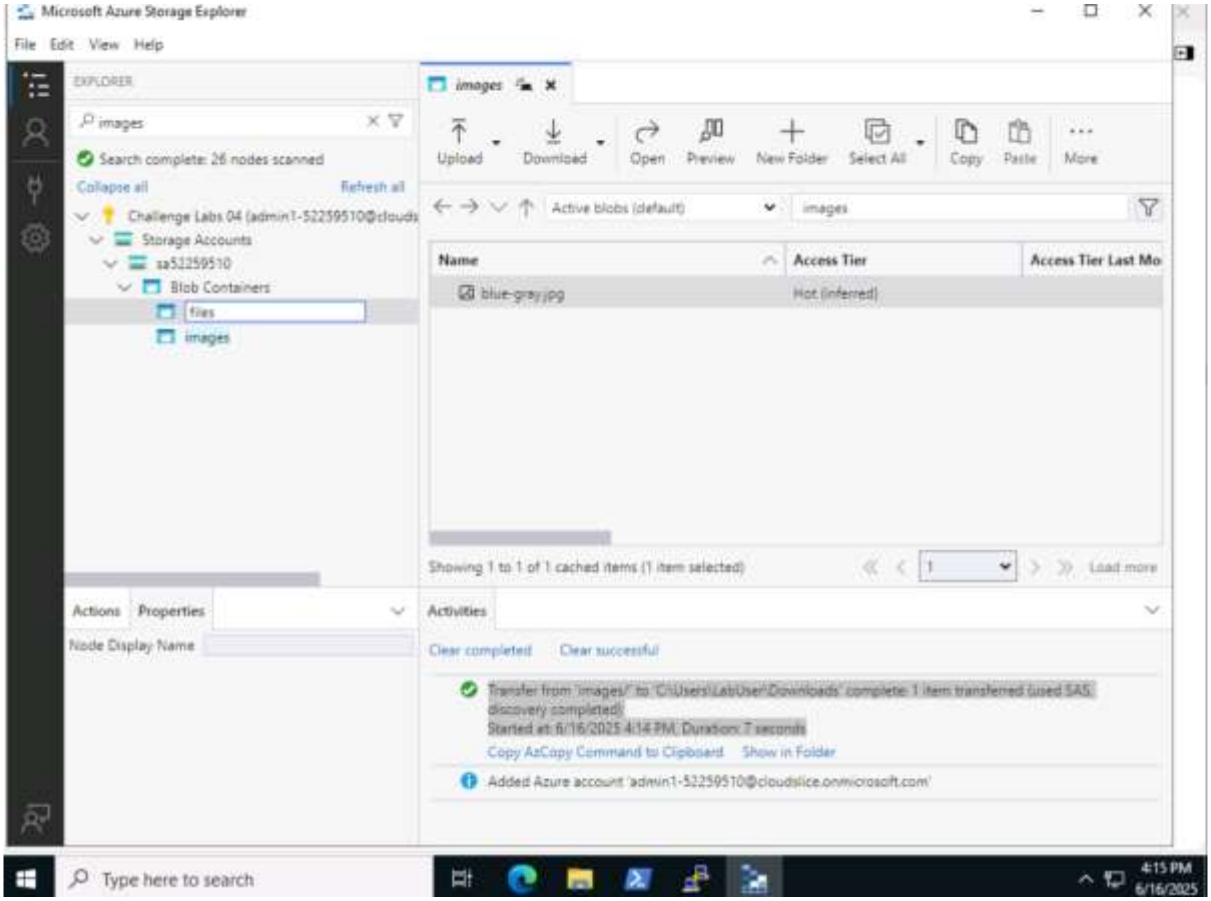
Node Display Name	Blob C
Custom Domain	
Soft Delete	Enabled
Retention Days	7

Transfer from 'images/' to 'C:\Users\LabUser\Downloads' complete: 1 item transferred (used SAS, discovery completed)
Started at 6/16/2025 4:14 PM, Duration: 7 seconds

Added Azure account 'admin1-52259510@cloudslice.onmicrosoft.com'

Name the container as files.

On the Command bar, select Upload, select Upload Files.

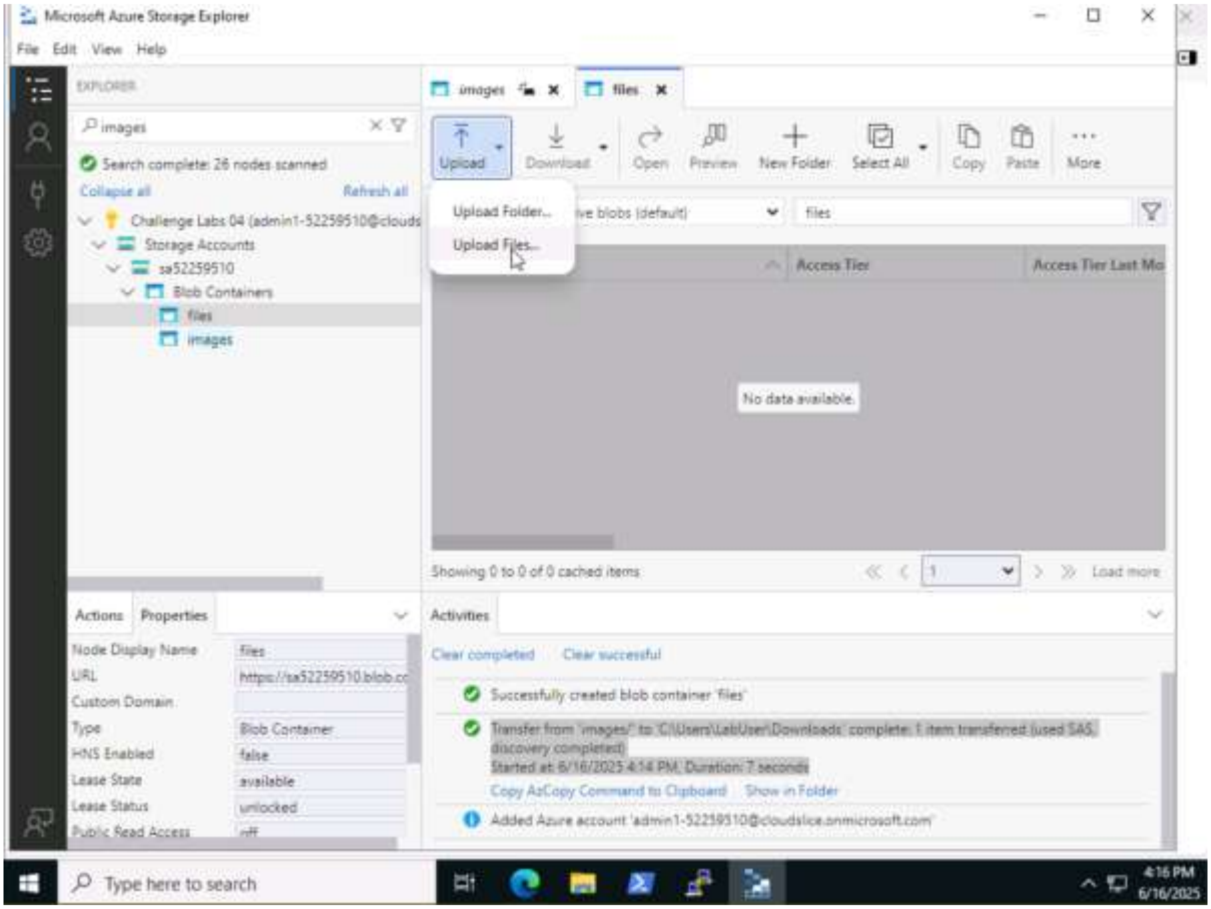


Name	Access Tier	Access Tier Last Mo
blue-gray.jpg	Hot (inferred)	

Showing 1 to 1 of 1 cached items (1 item selected)

Transfer from 'images/' to 'C:\Users\LabUser\Downloads' complete: 1 item transferred (used SAS, discovery completed)
Started at 6/16/2025 4:14 PM, Duration: 7 seconds

Added Azure account 'admin1-52259510@cloudslice.onmicrosoft.com'



Node Display Name	files
URL	https://sa52259510.blob.co
Custom Domain	
Type	Blob Container
HNS Enabled	false
Lease State	available
Lease Status	unlocked
Public Read Access	off

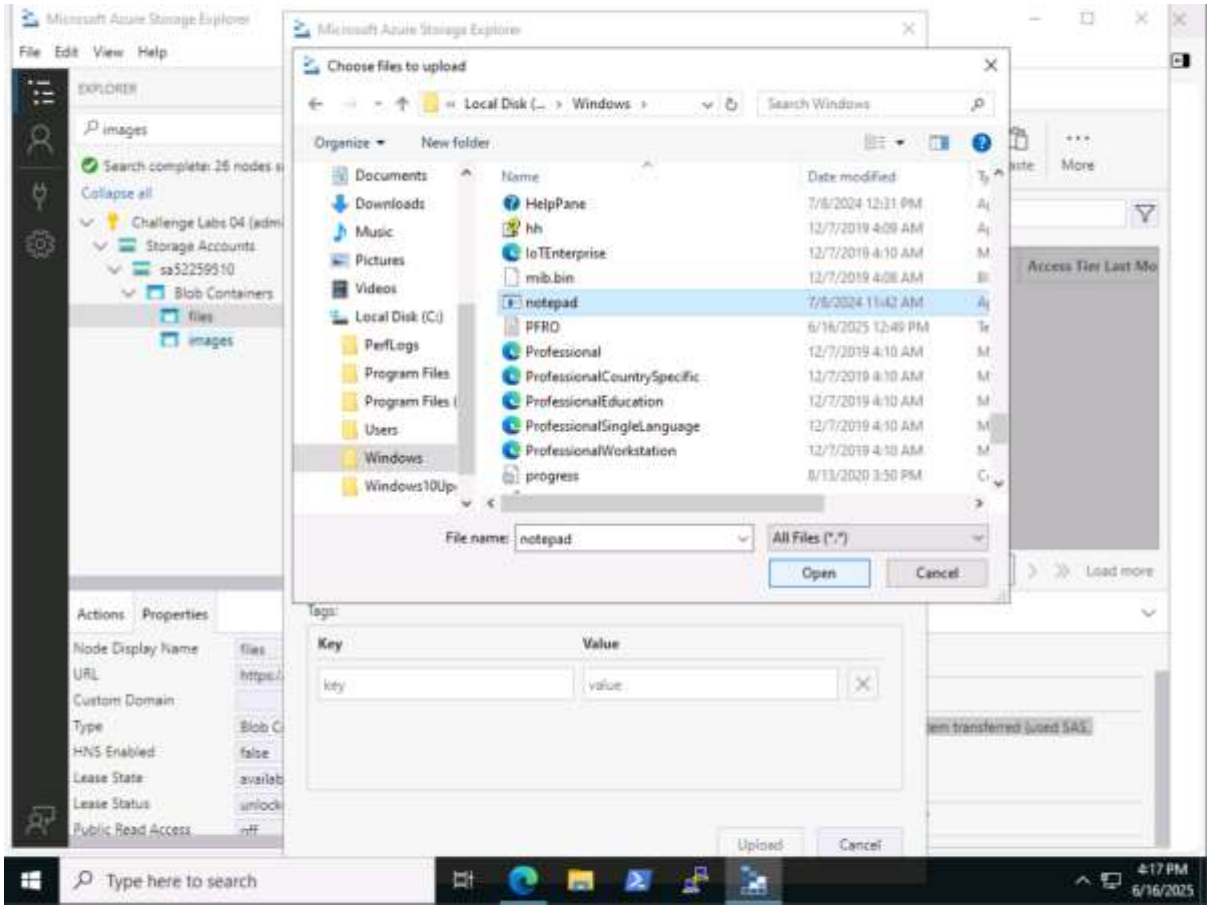
Successfully created blob container 'files'

Transfer from 'images/' to 'C:\Users\LabUser\Downloads' complete: 1 item transferred (used SAS, discovery completed)
Started at 6/16/2025 4:14 PM, Duration: 7 seconds

Added Azure account 'admin1-52259510@cloudslice.onmicrosoft.com'

In the Upload Files dialog, select the ellipse button.

In the Choose files to upload dialog, select any file, and then select Open.



Name	Date modified
HelpPane	7/6/2024 12:31 PM
hh	12/7/2019 4:09 AM
IoTEnterprise	12/7/2019 4:10 AM
mib.bin	12/7/2019 4:08 AM
notepad	7/6/2024 11:42 AM
PFRO	6/16/2025 12:49 PM
Professional	12/7/2019 4:10 AM
ProfessionalCountrySpecific	12/7/2019 4:10 AM
ProfessionalEducation	12/7/2019 4:10 AM
ProfessionalSingleLanguage	12/7/2019 4:10 AM
ProfessionalWorkstation	12/7/2019 4:10 AM
progress	8/13/2020 3:50 PM

File name: notepad

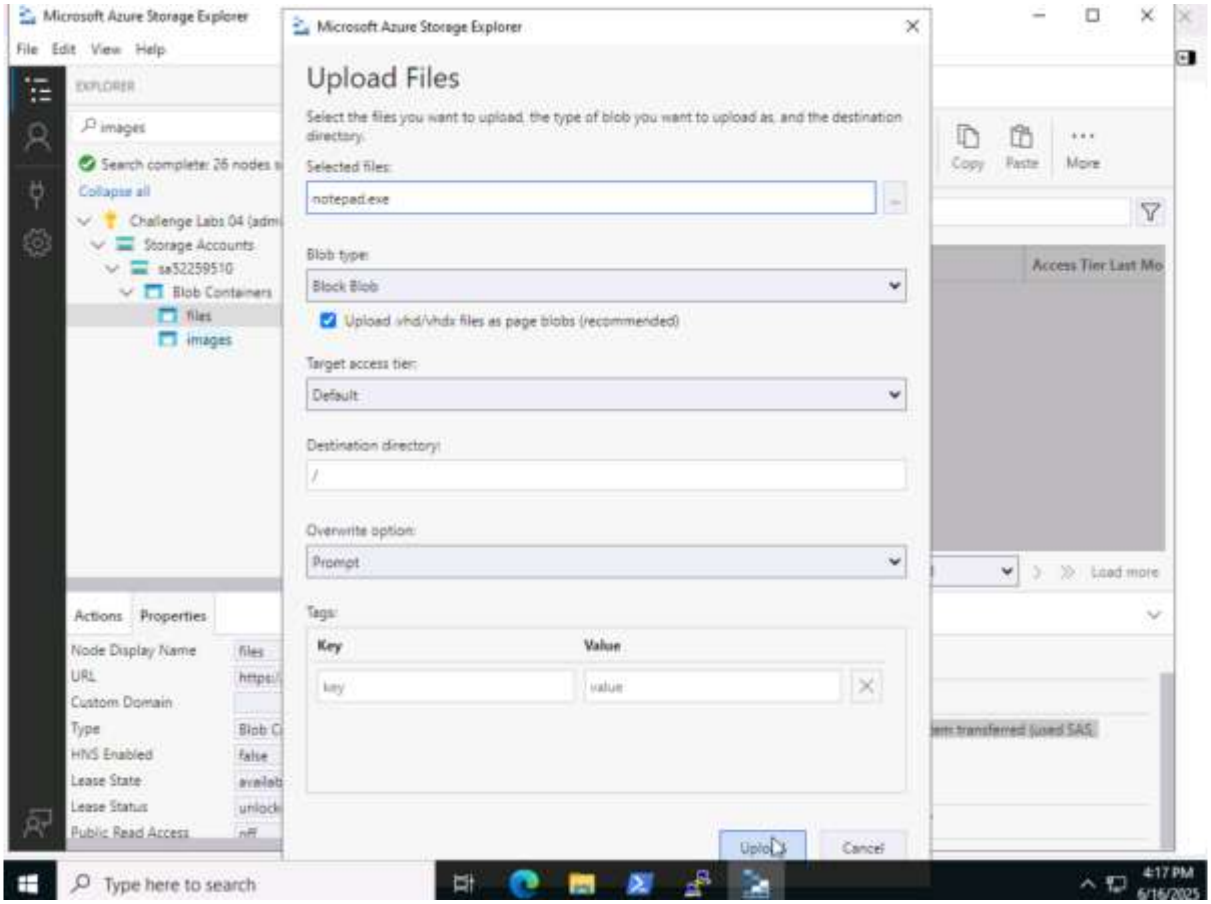
All Files (*.*)

Key	Value
key	value

Actions	Properties
Node Display Name	files
URL	https:/
Custom Domain	
Type	Blob C
HNS Enabled	false
Lease State	availab
Lease Status	unlock
Public Read Access	off

tem transferred (used SAS.

In the Upload Files dialog, select Upload.



Microsoft Azure Storage Explorer

Upload Files

Select the files you want to upload, the type of blob you want to upload as, and the destination directory.

Selected files: notepad.exe

Blob type: Block Blob

☑ Upload .vhd/.vhdx files as page blobs (recommended)

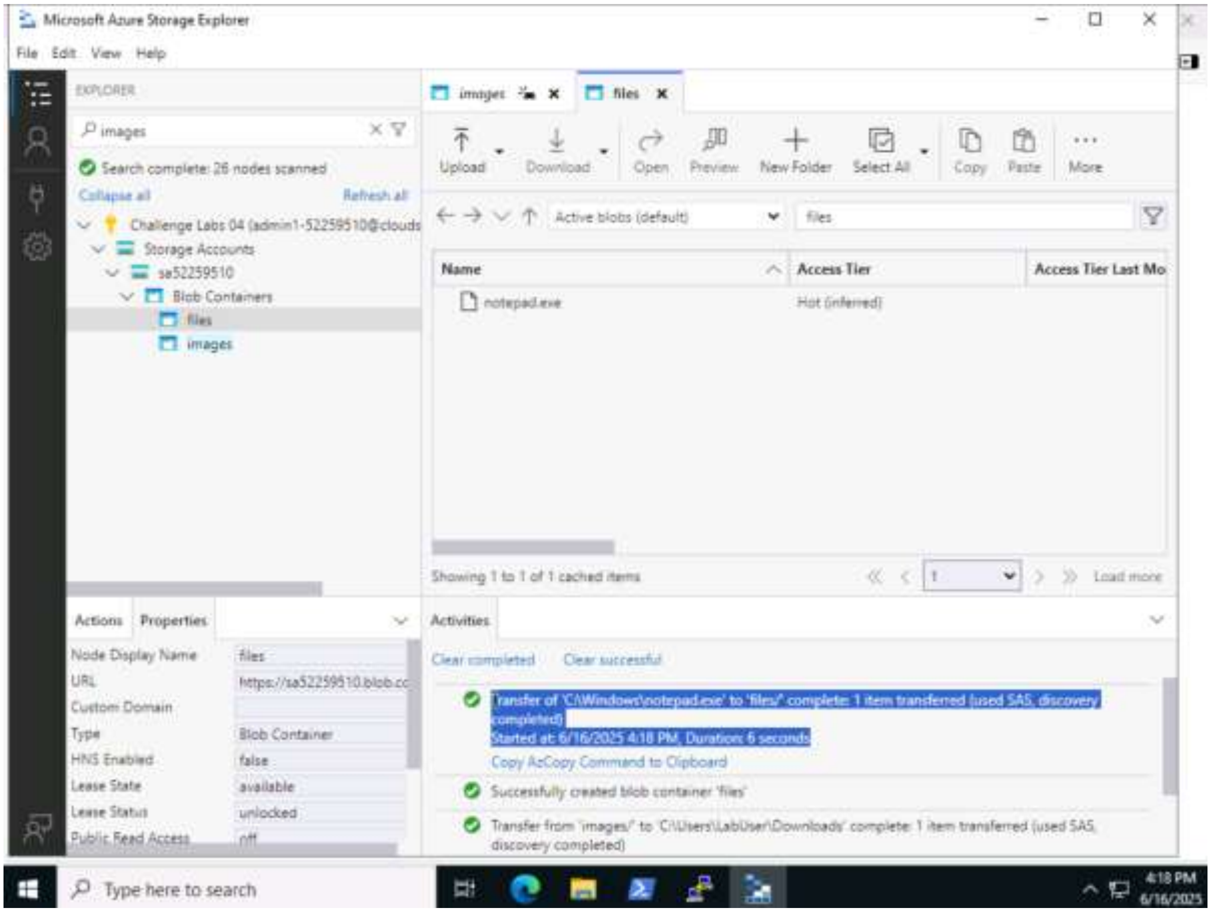
Target access tier: Default

Destination directory: /

Overwrite option: Prompt

Tags:

Key	Value
key	value



Name	Access Tier	Access Tier Last Mo
notepad.exe	Hot (inferred)	

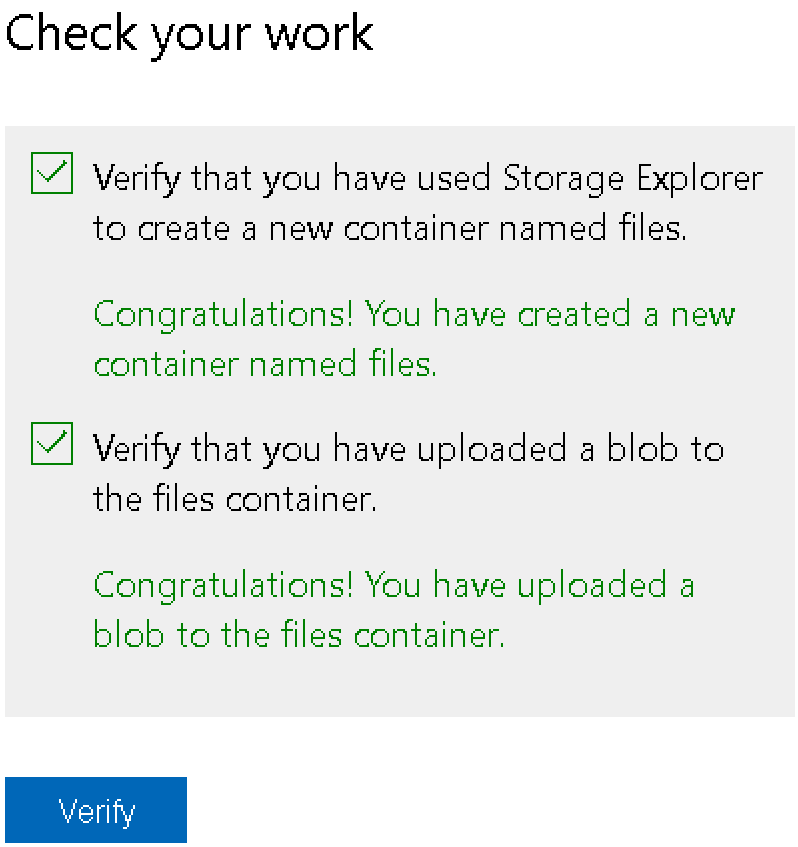
Showing 1 to 1 of 1 cached items

Node Display Name	files
URL	https://sa52259510.blob.cc
Custom Domain	
Type	Blob Container
HNS Enabled	false
Lease State	available
Lease Status	unlocked
Public Read Access	off

Transfer of 'C:\Windows\notepad.exe' to 'files/' complete: 1 item transferred (used SAS, discovery completed)
Started at: 6/16/2025 4:18 PM, Duration: 6 seconds

Successfully created blob container 'files'

Transfer from 'images/' to 'C:\Users\LabUser\Downloads' complete: 1 item transferred (used SAS, discovery completed)



Check your work

☑ Verify that you have used Storage Explorer to create a new container named files.

Congratulations! You have created a new container named files.

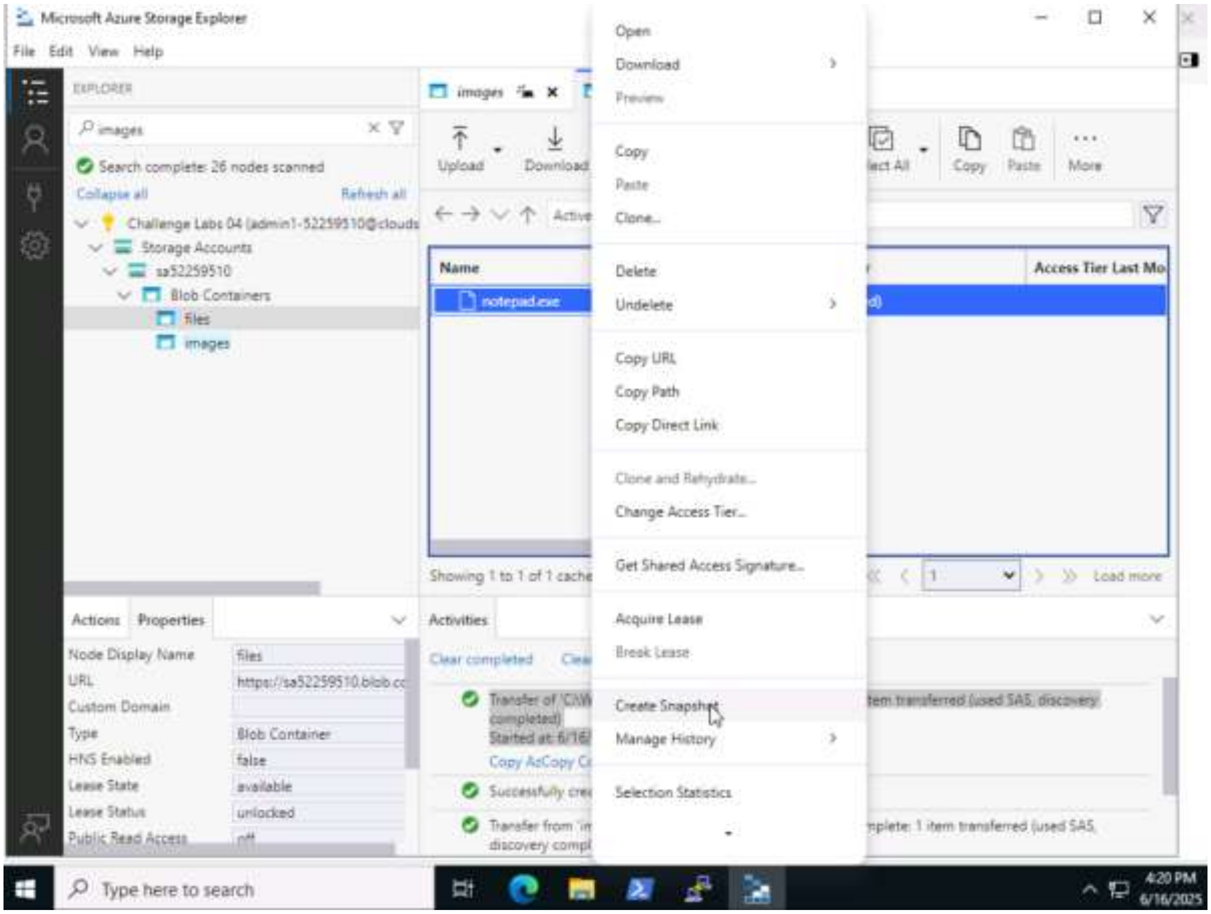
☑ Verify that you have uploaded a blob to the files container.

Congratulations! You have uploaded a blob to the files container.

- Create a snapshot

Create a snapshot of the blob file and display it using the Manage snapshots option.

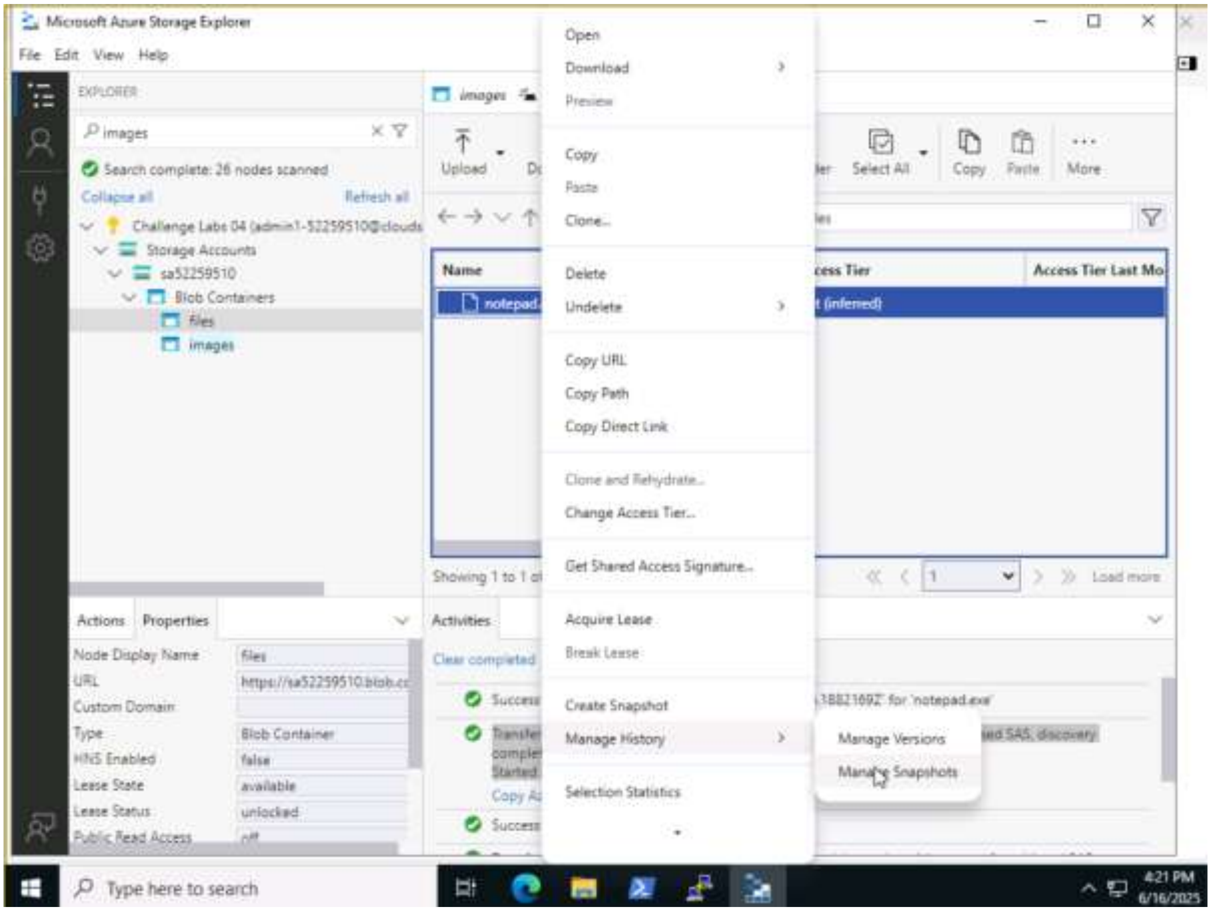
In Microsoft Azure Storage Explorer, in the files container, right-click on the file that you uploaded, and then on the command bar, select Create Snapshot.



Node Display Name: files
URL: https://sa52259510.blob.cc
Custom Domain:
Type: Blob Container
HNS Enabled: false
Lease State: available
Lease Status: unlocked
Public Read Access: off

Transfer of 'C:\W ... item transferred (used SAS, discovery completed)
Started at: 6/16/
Copy AzCopy C
Successfully crea
Transfer from 'im ... nplete: 1 item transferred (used SAS, discovery compl

Right-click the file again, and then in Manage History, select Manage Snapshots.



Node Display Name	files
URL	https://sa52259510.blob.c
Custom Domain	
Type	Blob Container
HNS Enabled	false
Lease State	available
Lease Status	unlocked
Public Read Access	off

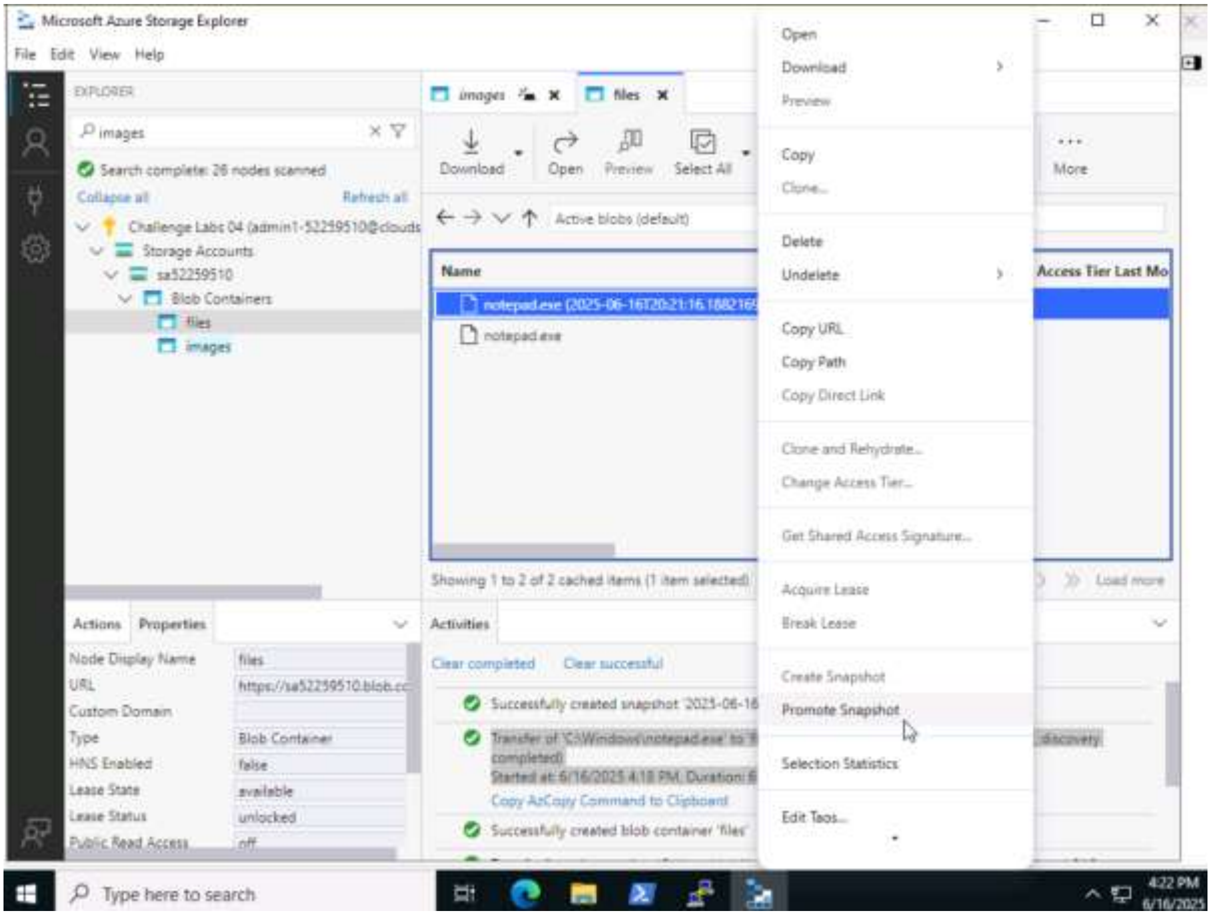
Success ...1882169Z' for 'notepad.exe'

Transfer complete ... Started ... sed SAS, discovery

Success

- Use the option Promote snapshot to overwrite the original blob file to emulate a revert operation.

In Snapshot Manager, right click the snapshot of the image file, and then select Promote Snapshot.



Search complete: 26 nodes scanned

notepad.exe (2025-06-16T20:21:16.1882169
notepad.exe

Showing 1 to 2 of 2 cached items (1 item selected)

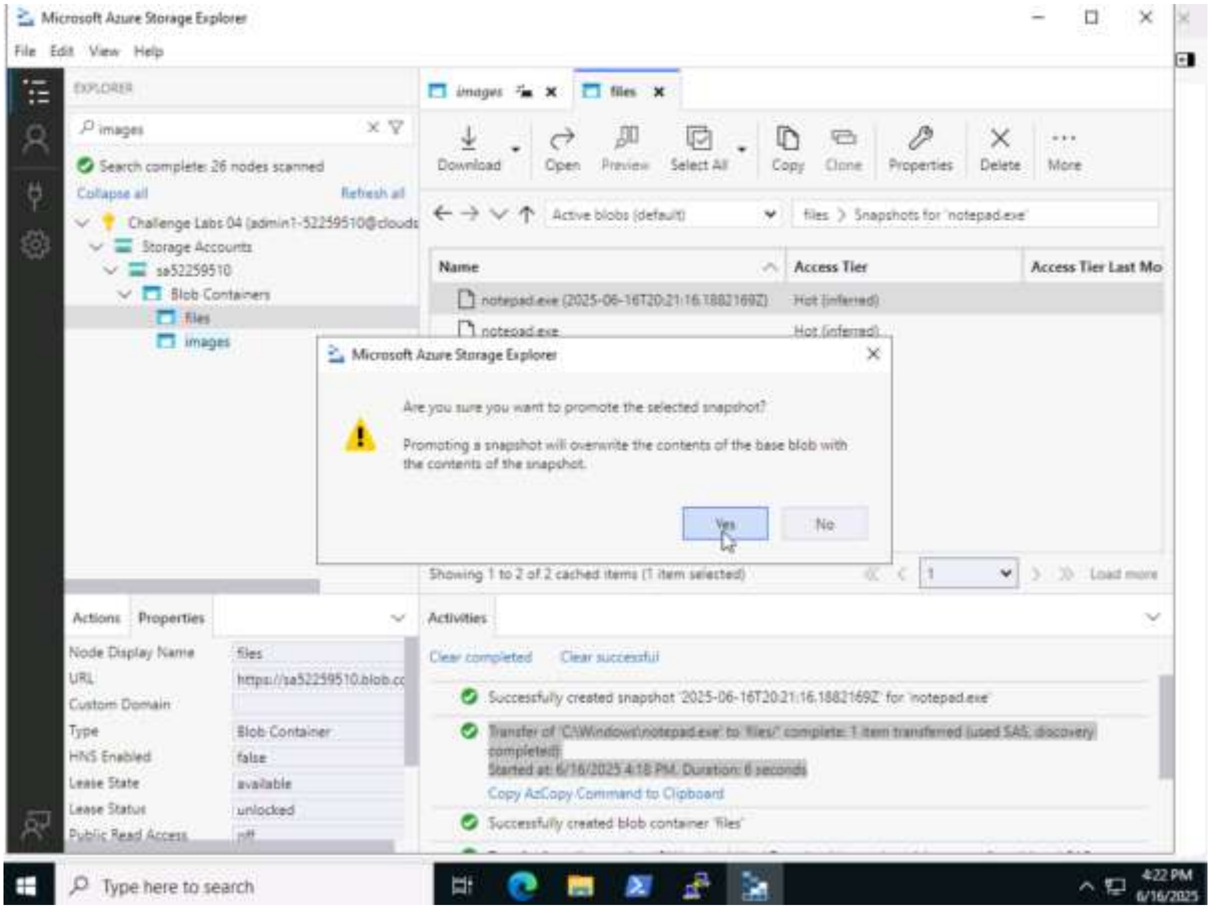
Node Display Name	files
URL	https://sa52259510.blob.cc
Custom Domain	
Type	Blob Container
HNS Enabled	false
Lease State	available
Lease Status	unlocked
Public Read Access	off

Successfully created snapshot '2025-06-16

Transfer of 'C:\Windows\notepad.exe' to 'f ... discovery completed)
Started at: 6/16/2025 4:18 PM, Duration: 6

Successfully created blob container 'files'

In the confirmation dialog, select Yes.



Search complete: 26 nodes scanned

Name	Access Tier	Access Tier Last Mo
notepad.exe (2025-06-16T20:21:16.1882169Z)	Hot (inferred)	
notepad.exe	Hot (inferred)	

Showing 1 to 2 of 2 cached items (1 item selected)

Microsoft Azure Storage Explorer

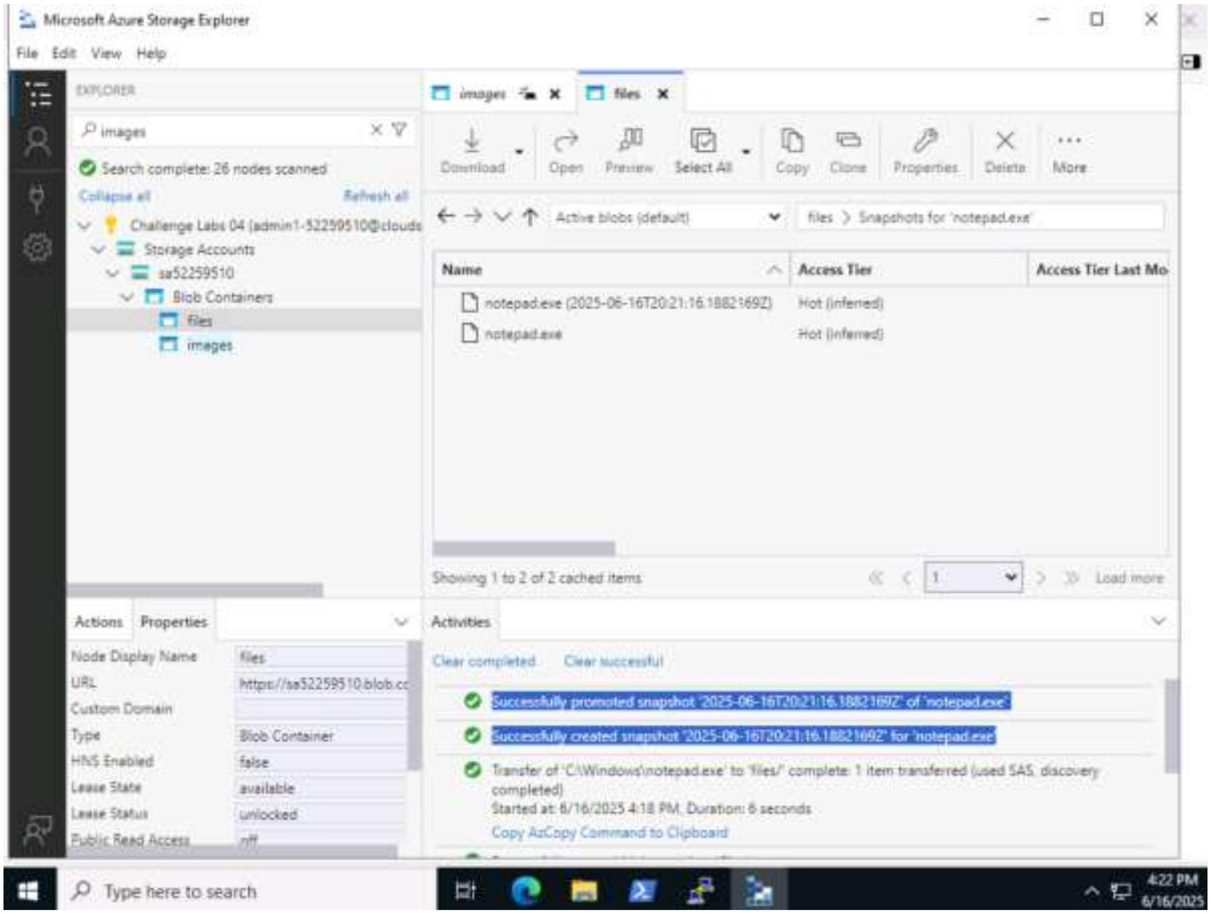
Are you sure you want to promote the selected snapshot?

Promoting a snapshot will overwrite the contents of the base blob with the contents of the snapshot.

Yes No

Node Display Name	files
URL	https://sa52259510.blob.cc
Custom Domain	
Type	Blob Container
HNS Enabled	false
Lease State	available
Lease Status	unlocked
Public Read Access	off

```
Successfully created snapshot '2025-06-16T20:21:16.1882169Z' for 'notepad.exe'
Transfer of 'C:\Windows\notepad.exe' to 'files/' complete: 1 item transferred (used SAS, discovery completed)
Started at: 6/16/2025 4:18 PM, Duration: 6 seconds
Successfully created blob container 'files'
```



Search complete: 26 nodes scanned

Name	Access Tier	Access Tier Last Mo
notepad.exe (2025-06-16T20:21:16.1882169Z)	Hot (inferred)	
notepad.exe	Hot (inferred)	

Node Display Name	files
URL	https://sa52259510.blob.cc
Custom Domain	
Type	Blob Container
HNS Enabled	false
Lease State	available
Lease Status	unlocked
Public Read Access	off

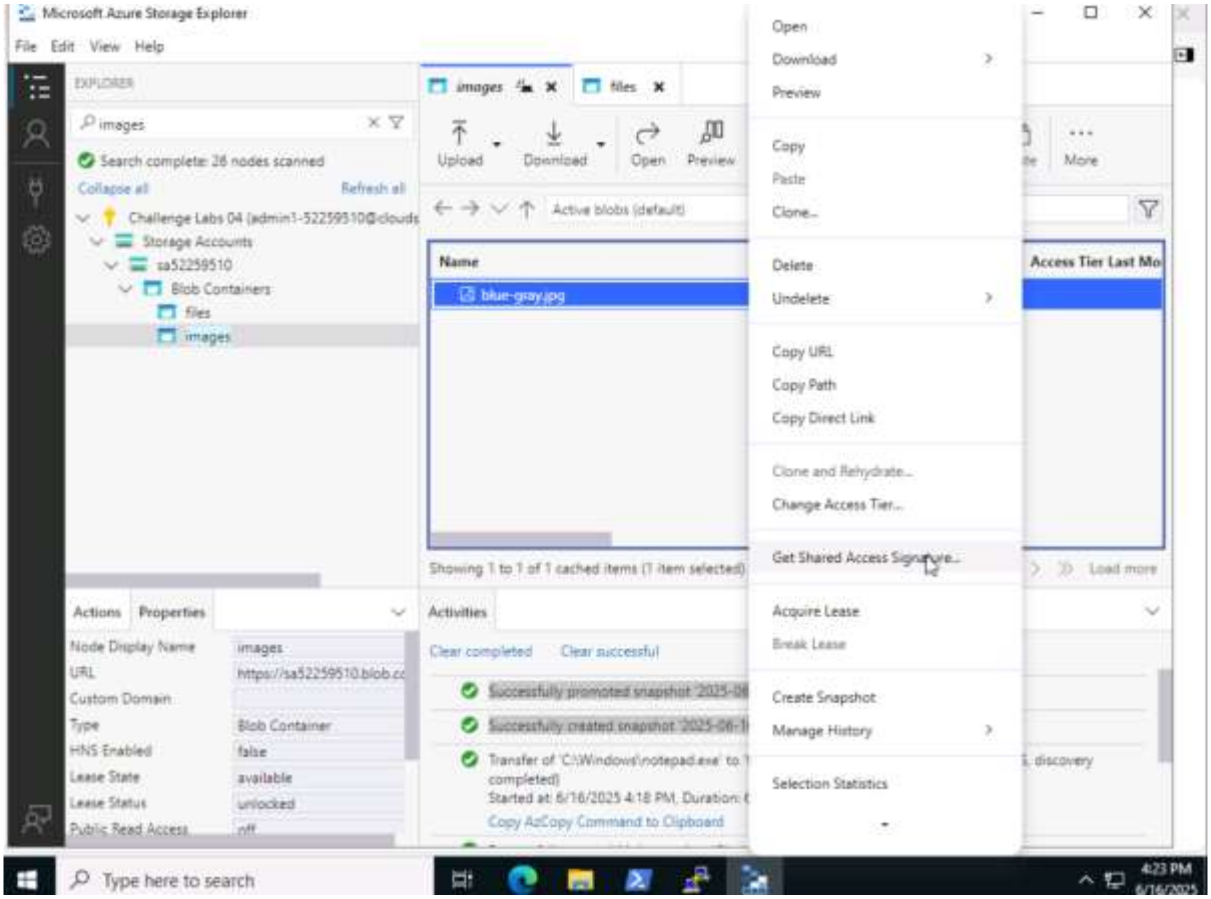
Successfully promoted snapshot '2025-06-16T20:21:16.1882169Z' of 'notepad.exe'

Successfully created snapshot '2025-06-16T20:21:16.1882169Z' for 'notepad.exe'

Transfer of 'C:\Windows\notepad.exe' to 'files/' complete: 1 item transferred (used SAS, discovery completed)
Started at: 6/16/2025 4:18 PM, Duration: 6 seconds

- Obtain the Shared Access Signature for the original image you uploaded to the files folder, and then confirm that you can access it by pasting the shared access signature url in a new Microsoft Edge browser tab.

In the files folder, right-click the original image file, and then select Get Shared Access Signature.



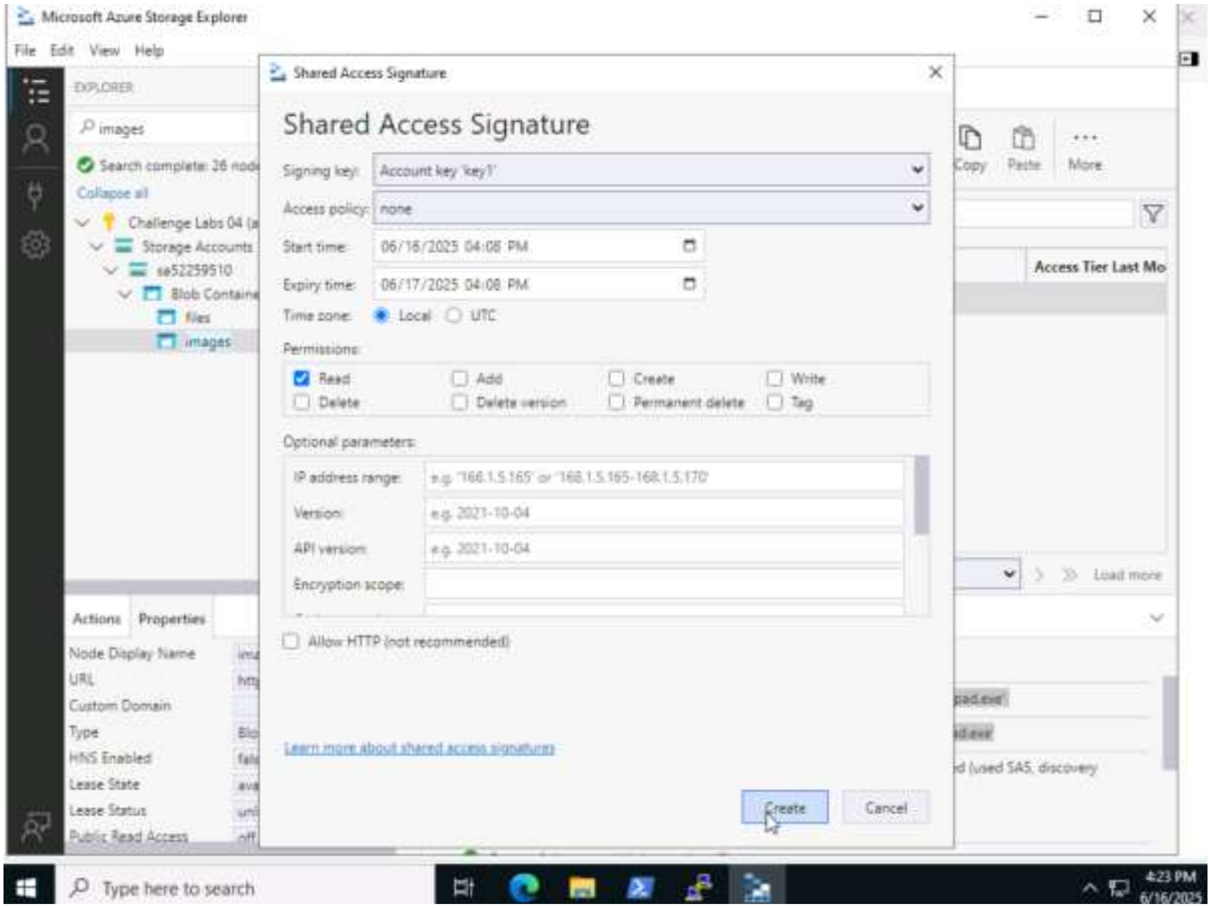
Node Display Name: images
URL: https://sa52259510.blob.co
Custom Domain:
Type: Blob Container
HNS Enabled: false
Lease State: available
Lease Status: unlocked
Public Read Access: off

Successfully promoted snapshot '2025-06

Successfully created snapshot '2025-06-1

Transfer of 'C:\Windows\notepad.exe' to ... discovery completed)
Started at: 6/16/2025 4:18 PM, Duration: (
Copy AzCopy Command to Clipboard

In the Share Access Signature dialog, select Create.



Shared Access Signature

Signing key: Account key 'key1'

Access policy: none

Start time: 06/16/2025 04:08 PM

Expiry time: 06/17/2025 04:08 PM

Time zone: ● Local ○ UTC

Permissions:

☑ Read ☐ Add ☐ Create ☐ Write
☐ Delete ☐ Delete version ☐ Permanent delete ☐ Tag

Optional parameters:

IP address range: e.g. '168.1.5.165' or '168.1.5.165-168.1.5.170'

Version: e.g. 2021-10-04

API version: e.g. 2021-10-04

Encryption scope:

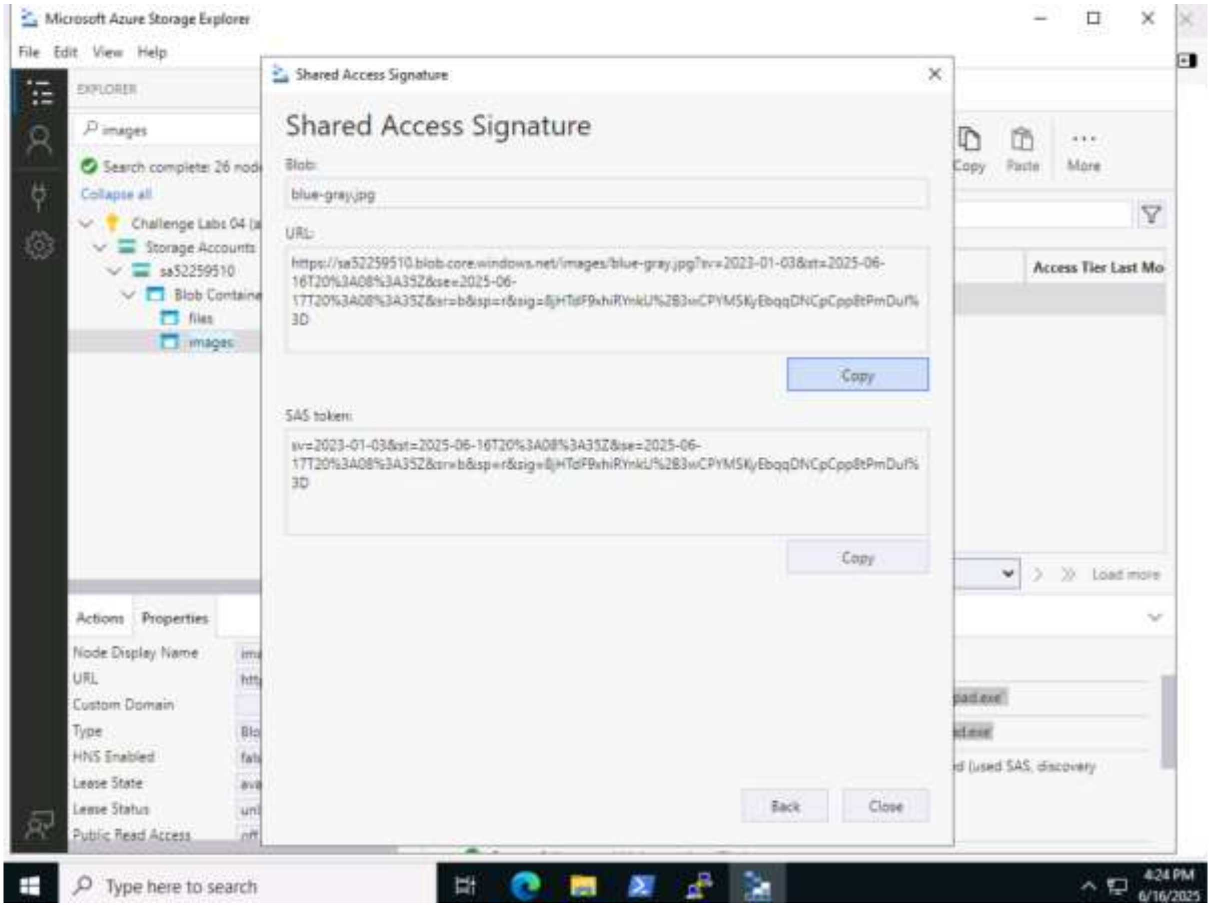
☐ Allow HTTP (not recommended)

Learn more about shared access signatures

Create Cancel

Node Display Name	ima
URL	http
Custom Domain	
Type	Blo
HNS Enabled	fals
Lease State	ava
Lease Status	unl
Public Read Access	off

Copy the URL field and paste it into a new Microsoft Edge browser tab.



Node Display Name
URL
Custom Domain
Type
HNS Enabled
Lease State
Lease Status
Public Read Access

Shared Access Signature

Blob:

blue-gray.jpg

URL:

```
https://sa52259510.blob.core.windows.net/images/blue-gray.jpg?sv=2023-01-03&st=2025-06-
16T20%3A08%3A35Z&se=2025-06-
17T20%3A08%3A35Z&sr=b&sp=r&sig=8jHTdF9xhiRYnkU%2B3wCPYMSKyEbqqDNCpCpp8tPmDuf%
3D
```

Copy

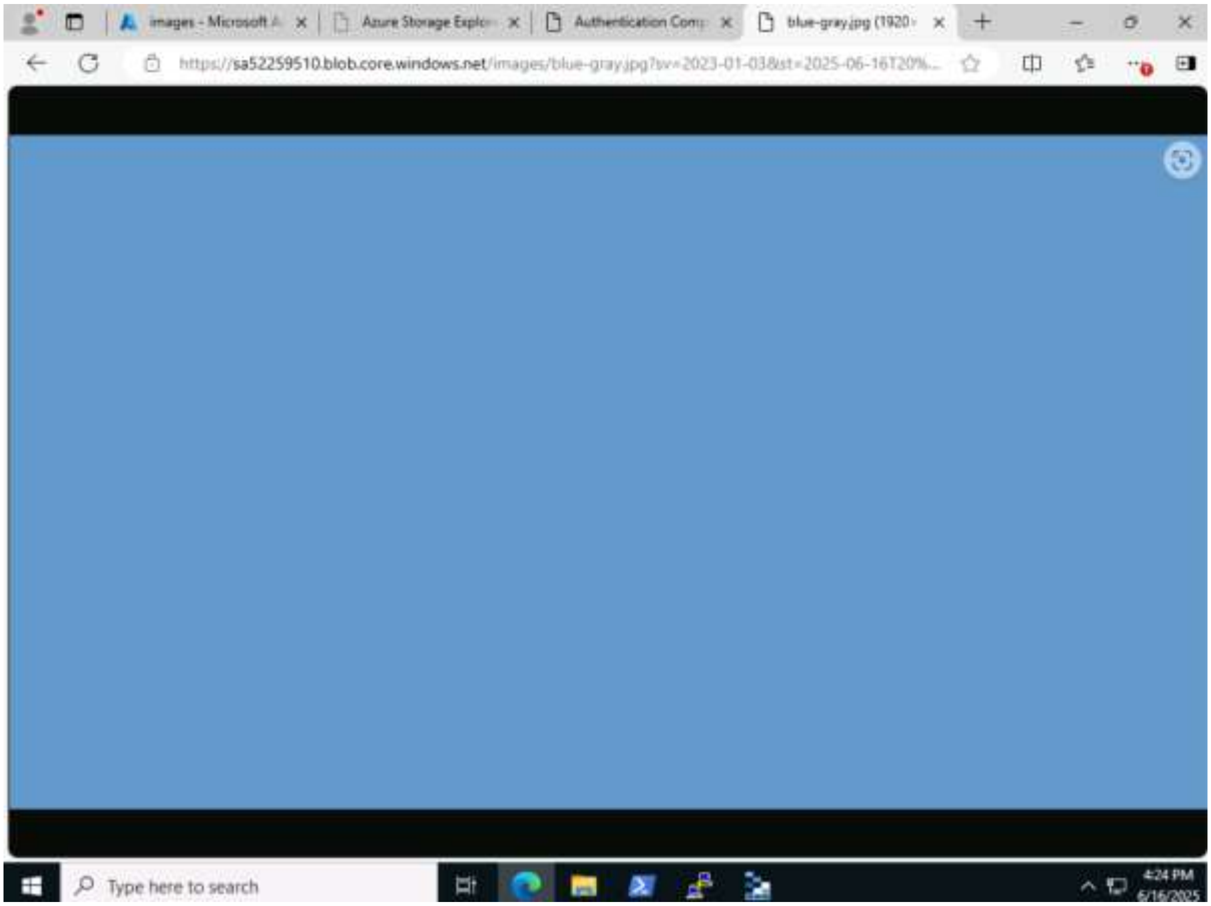
SAS token:

```
sv=2023-01-03&st=2025-06-16T20%3A08%3A35Z&se=2025-06-
17T20%3A08%3A35Z&sr=b&sp=r&sig=8jHTdF9xhiRYnkU%2B3wCPYMSKyEbqqDNCpCpp8tPmDuf%
3D
```

Copy

Back Close

Confirm the image that you uploaded opens in the browser.

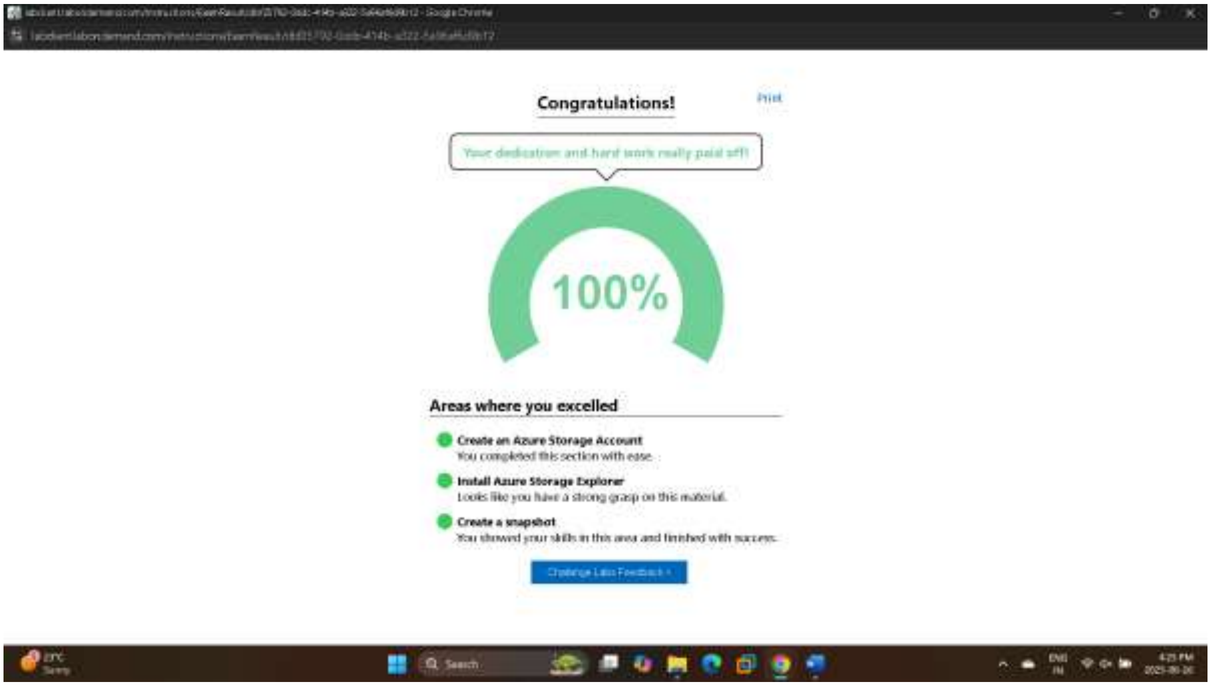


Check your work

☑ Verify that you have created a snapshot of the blob that you uploaded to the files container.

Congratulations! You have created a snapshot of the blob that you uploaded to the files container.

Verify


Congratulations!

Your dedication and hard work really paid off!

100%

Areas where you excelled

- Create an Azure Storage Account
  You completed this section with ease.
- Install Azure Storage Explorer
  Looks like you have a strong grasp on this material.
- Create a snapshot
  You showed your skills in this area and finished with success.

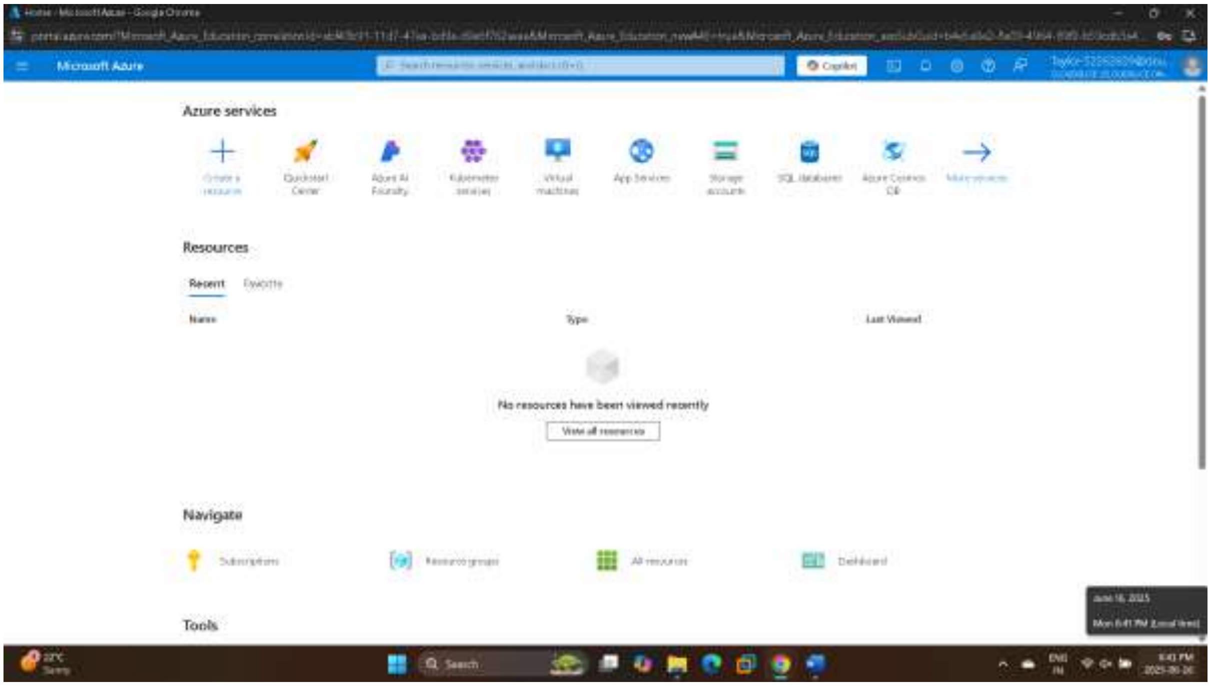
Learning & Opinion

Azure Storage Explorer is a graphical tool so we can manage Azure Storage resources like blob containers, queues, and files. We are able to create and then manage containers and also upload and then download files with it. It is possible to configure access levels securely using it as well. Images or documents can be stored inside Blob storage. Unstructured data benefits from Blob storage. Snapshots provide a versioning system. Data can thus be preserved to or reverted to a previous state. Shared Access Signatures can offer the secure access to the specific storage resources for use. These signatures also offer access without time-bound exposing account keys. Since you understand these features, data in Azure cloud environments is integral, secure, and available for you.

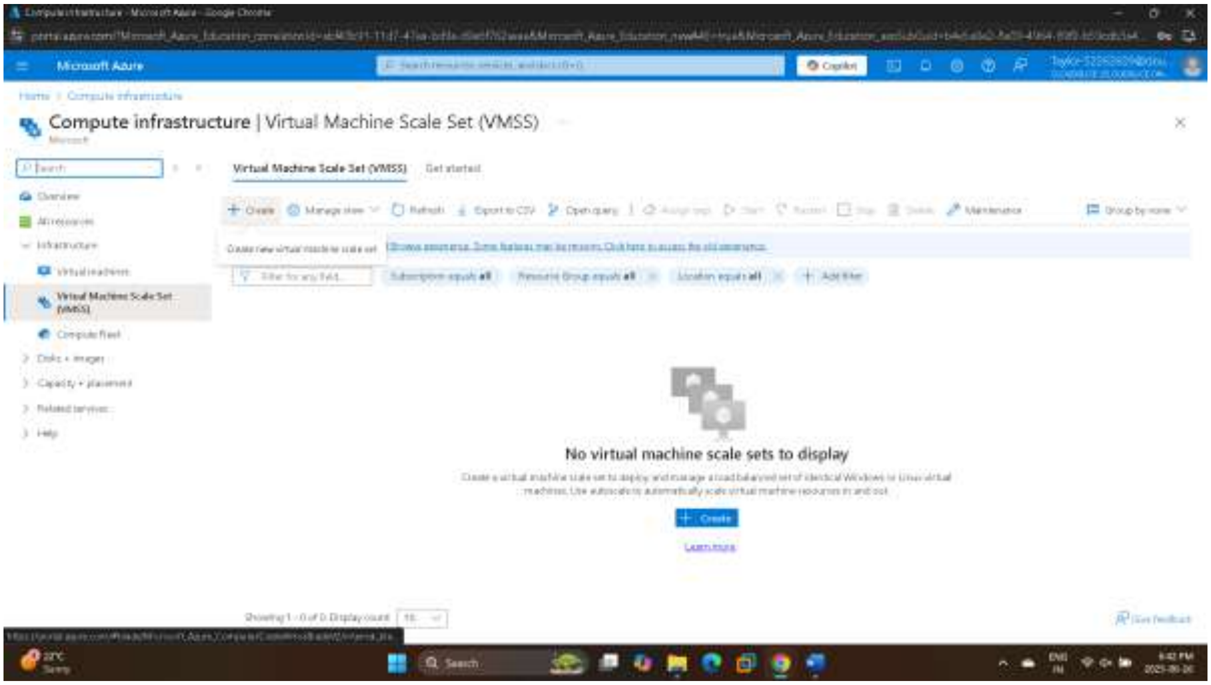
Task04: Enable Azure Virtual Machine Scale Sets for High Availability and Scalability

- Create an Azure virtual machine scale set for a web server tier

On the Azure portal home page, in Azure services, select Create a resource.



In the Azure Marketplace, search for and select Virtual machine scale set and then select Create.



On the Create a virtual machine scale set blade, on the Basics page, in Project details, in Resource group, select corp-datalod52262609.

In Scale set details, in Virtual machine scale set name, enter vmfe52262609, in Region, ensure that (US) East US is selected.

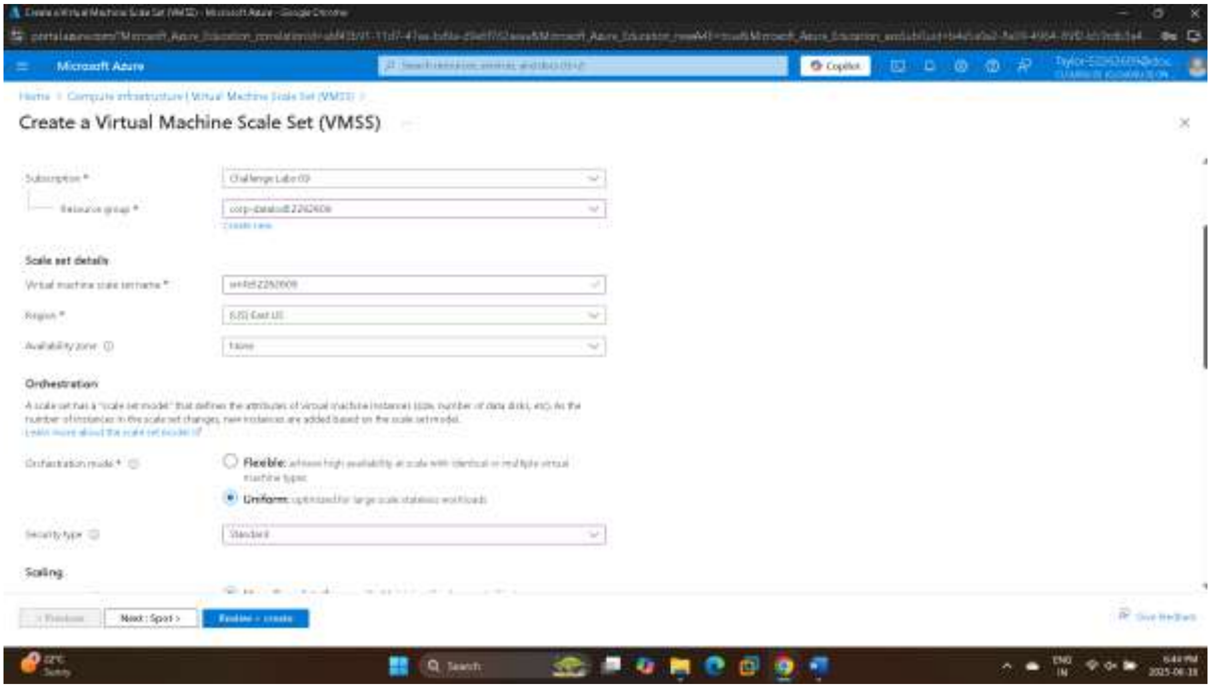
In Orchestration, in Orchestration mode, select Uniform, and then in Security type, select Standard.

In Scaling, in Instance count, ensure that 2 is entered.

In Instance details, in Image, select Windows Server 2019 Datacenter - x64 Gen2, and then in Size, select See all sizes.

On the Select a VM size blade, in Search by VM size, search for and select B2s, and then select Select.

In Administrator account, in Username, enter Student, in Password and Confirm password, enter Azure!kAgH7e!0D$q!.



Create a Virtual Machine Scale Set (VMSS)

Subscription * Challenge Labs 09

Resource group * corp-datalod52262609

Scale set details

Region * (US) East US

Availability zone None

Orchestration

A scale set has a "scale set model" that defines the attributes of virtual machine instances (size, number of data disks, etc). As the number of instances in the scale set changes, new instances are added based on the scale set model.

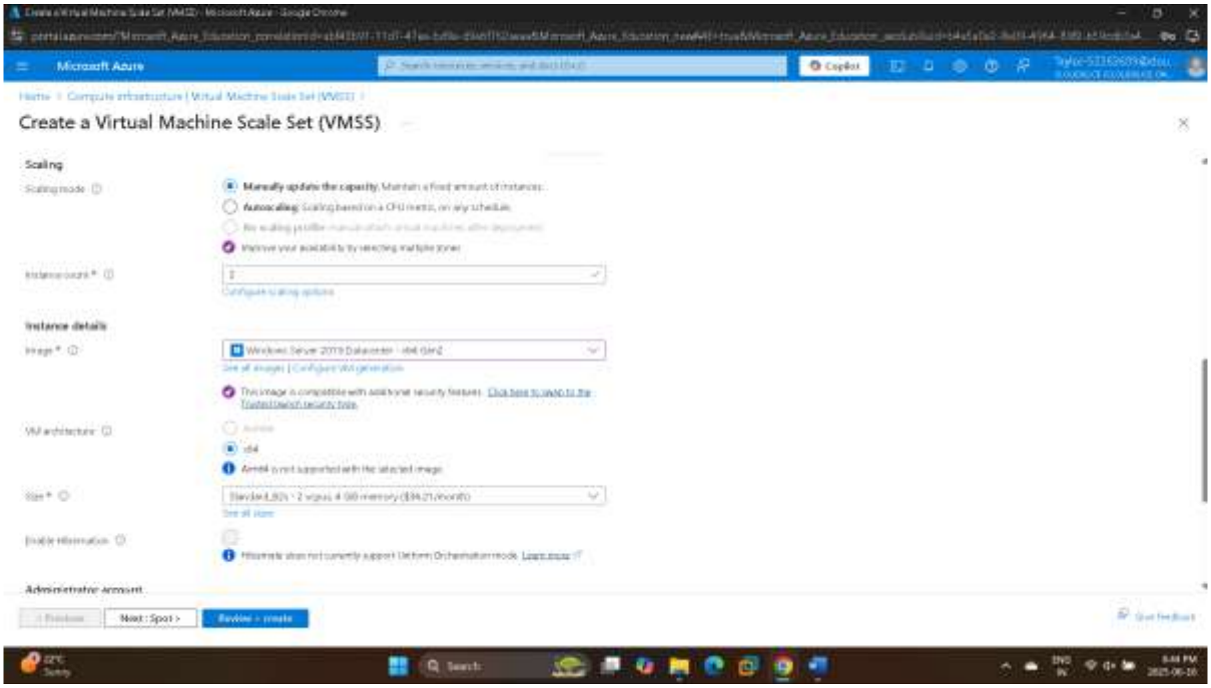
Orchestration mode *

○ Flexible: achieve high availability at scale with identical or multiple virtual machine types

● Uniform: optimized for large scale stateless workloads

Security type Standard

Scaling



Create a Virtual Machine Scale Set (VMSS)

Scaling

Scaling mode

● Manually update the capacity: Maintain a fixed amount of instances.

○ Autoscaling: Scaling based on a CPU metric, on any schedule.

Instance count * 2

Instance details

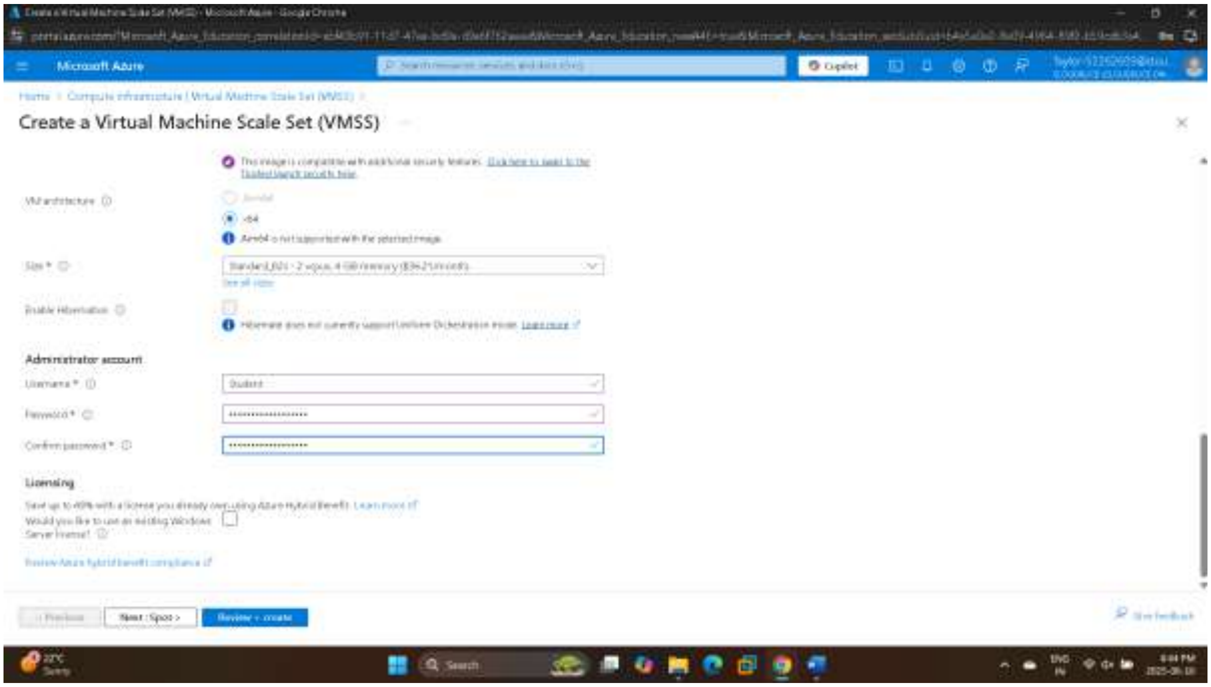
Image * Windows Server 2019 Datacenter - x64 Gen2

VM architecture

● x64

Size * Standard_B2s - 2 vcpus, 4 GiB memory ($34.21/month)

Administrator account



Create a Virtual Machine Scale Set (VMSS)

VM architecture: ○ Arm64 ● x64

Arm64 is not supported with the selected image.

Size *: Standard_B2s - 2 vcpus, 4 GiB memory ($36.21/month)

Enable Hibernation: □

Administrator account

Username *: Student

Password *: ••••••••••••••••••

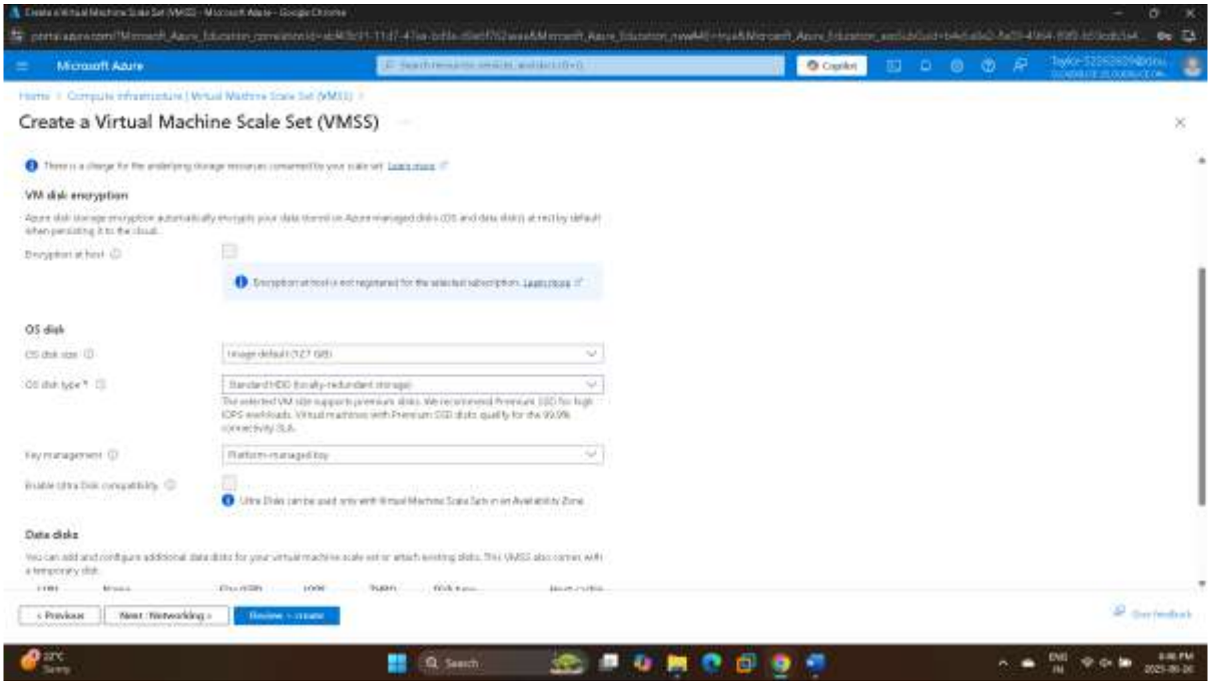
Confirm password *: ••••••••••••••••••

Licensing

Would you like to use an existing Windows Server license? □

On the Create a virtual machine scale set blade, advance to the Disks page.

On the Disks page, in OS disk, in OS disk type, select Standard HDD, and then select Next: Networking.



Create a Virtual Machine Scale Set (VMSS)

VM disk encryption

Encryption at host: □

OS disk

OS disk size: Image default (127 GiB)

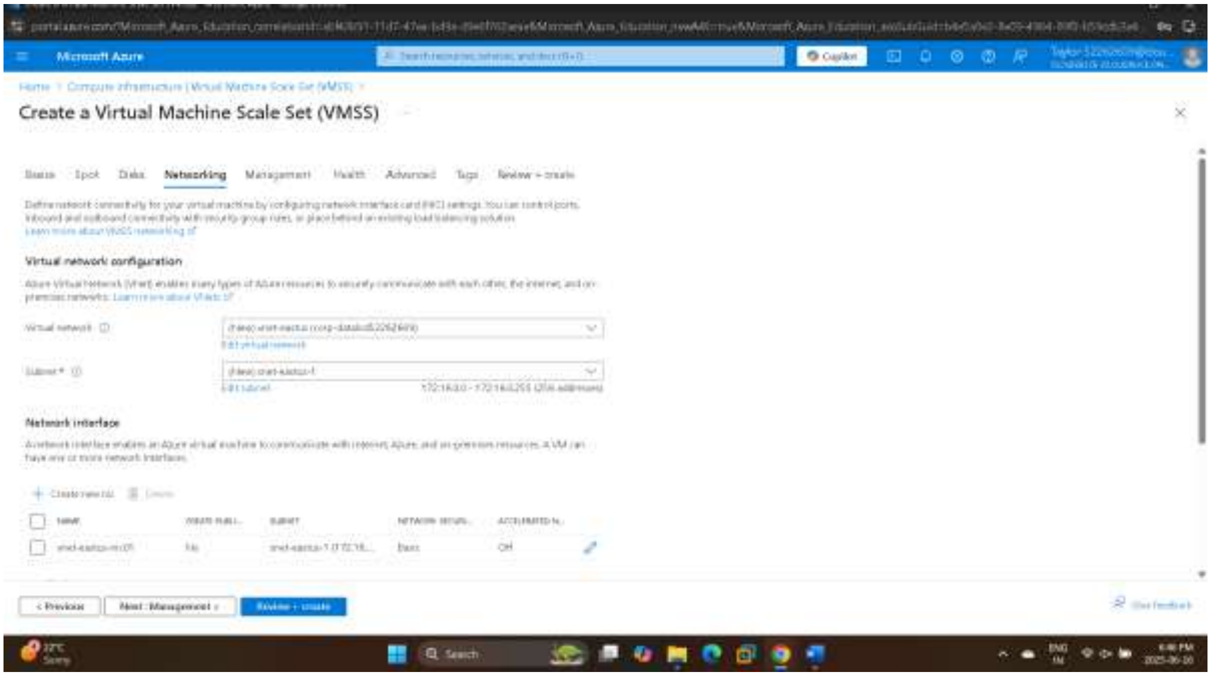
OS disk type *: Standard HDD (locally-redundant storage)

Key management: Platform-managed key

Enable Ultra Disk compatibility: □

Data disks

On the Networking page, in Virtual network configuration, in Virtual network, ensure that (new) vnet-eastus (corp-datalod52262609) is selected.



Microsoft Azure
Home > Compute infrastructure | Virtual Machine Scale Set (VMSS) >
Copilot

Create a Virtual Machine Scale Set (VMSS)

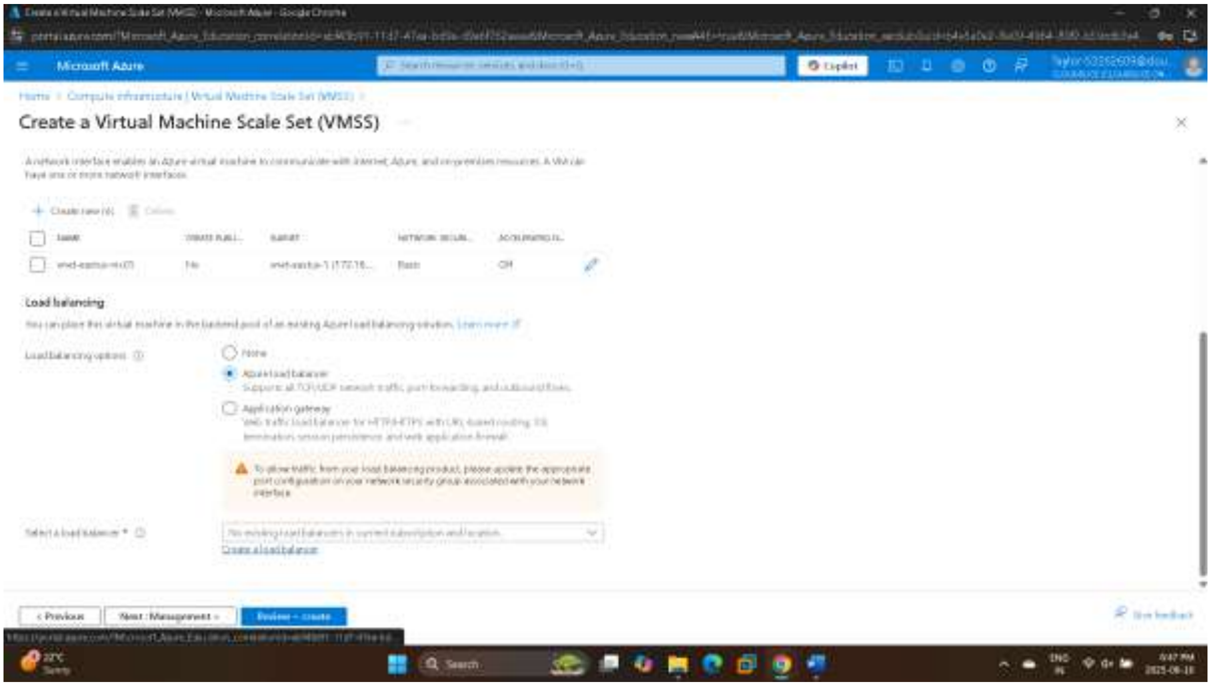
Virtual network configuration

Virtual network: (New) vnet-eastus (corp-data...)

Subnet *: (New) vnet-eastus-1

Network interface

In Load balancing, in Load balancing options, select Azure load balancer, and then in Select a load balancer, select Create a load balancer.



Create a Virtual Machine Scale Set (VMSS) - Microsoft Azure - Google Chrome
Microsoft Azure
Home > Compute infrastructure | Virtual Machine Scale Set (VMSS) >
Copilot

Create a Virtual Machine Scale Set (VMSS)

Load balancing

Load balancing options:

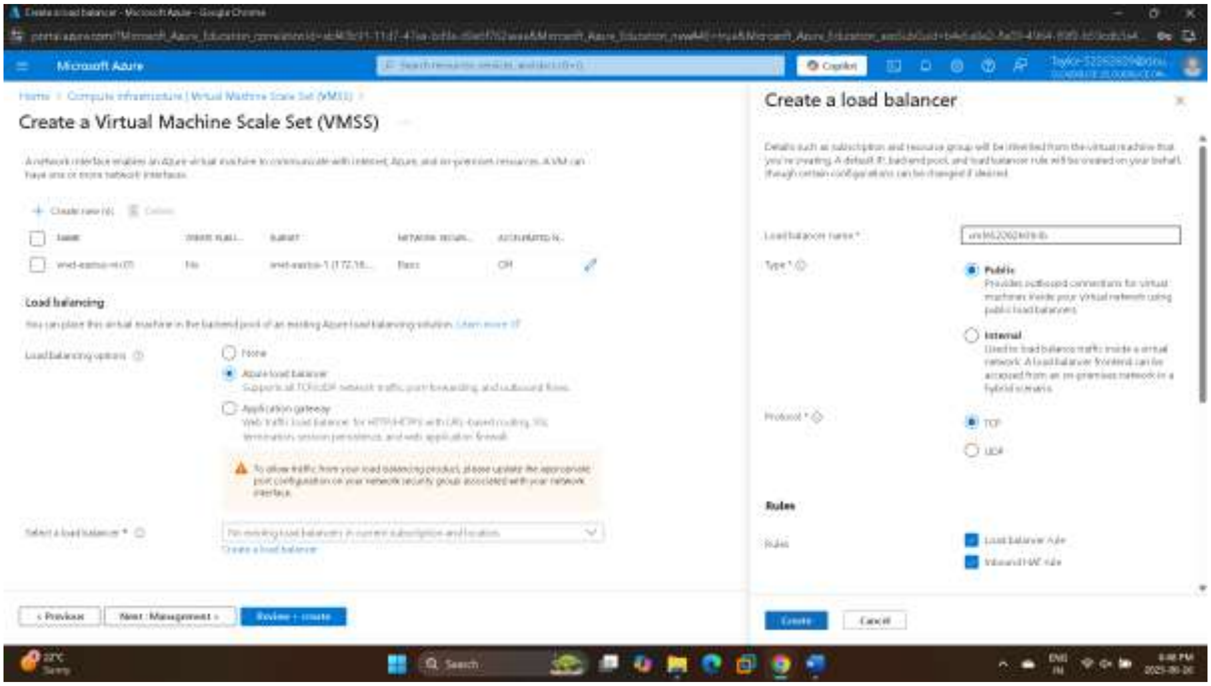
○ None

● Azure load balancer
Supports all TCP/UDP network traffic, port forwarding, and outbound flows.

○ Application gateway

Select a load balancer *: No existing load balancers in current subscription and location.

On the Create a load balancer blade, in Load balancer name, enter vmfe52262609-lb, and then select Create.



Create a Virtual Machine Scale Set (VMSS)

A network interface enables an Azure virtual machine to communicate with internet, Azure, and on-premises resources. A VM can have one or more network interfaces.

Load balancing

Load balancing options: ○ None ● Azure load balancer ○ Application gateway

To allow traffic from your load balancing product, please update the appropriate port configuration on your network security group associated with your network interface.

Select a load balancer *: No existing load balancers in current subscription and location

Create a load balancer

Details such as subscription and resource group will be inherited from the virtual machine that you're creating. A default IP, backend pool, and load balancer rule will be created on your behalf, though certain configurations can be changed if desired.

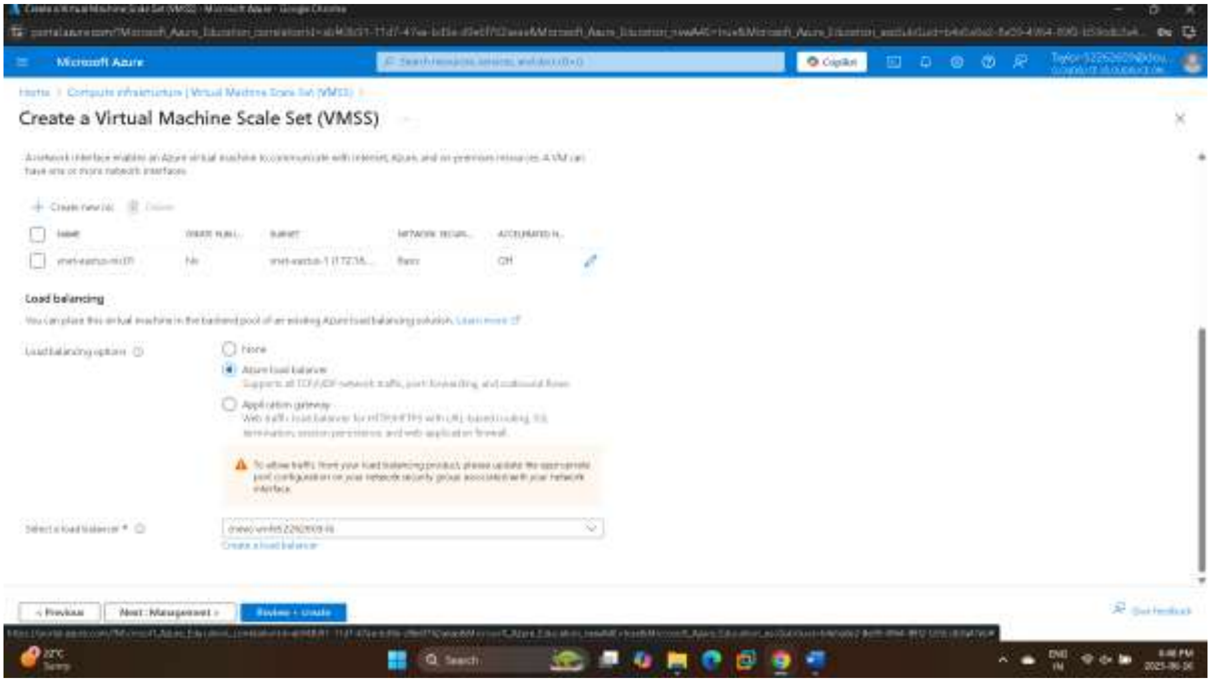
Load balancer name *: vmlb52262409-lb

Type *: ● Public ○ Internal

Protocol *: ● TCP ○ UDP

Rules

Rules: ☑ Load balancer rule ☑ Inbound NAT rule



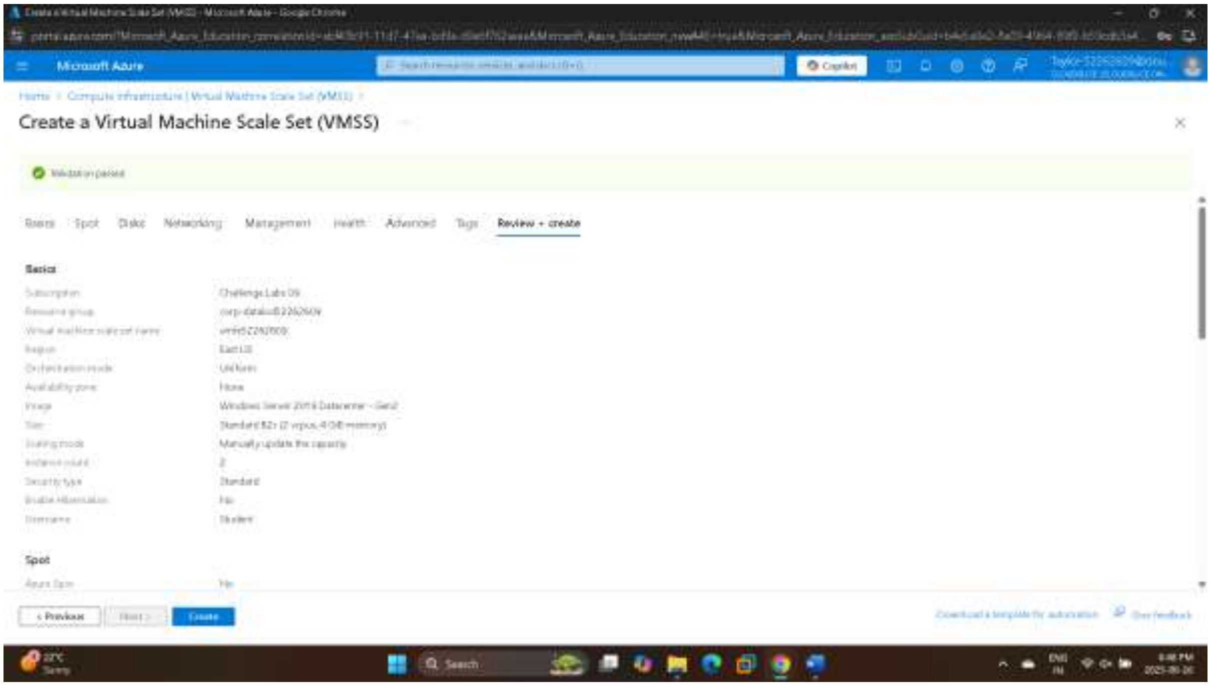
Create a Virtual Machine Scale Set (VMSS)

Load balancing

Load balancing options: ○ None ● Azure load balancer ○ Application gateway

Select a load balancer *: (new) vmlb52262409-lb

Select Review + create, and then select Create.



Create a Virtual Machine Scale Set (VMSS)

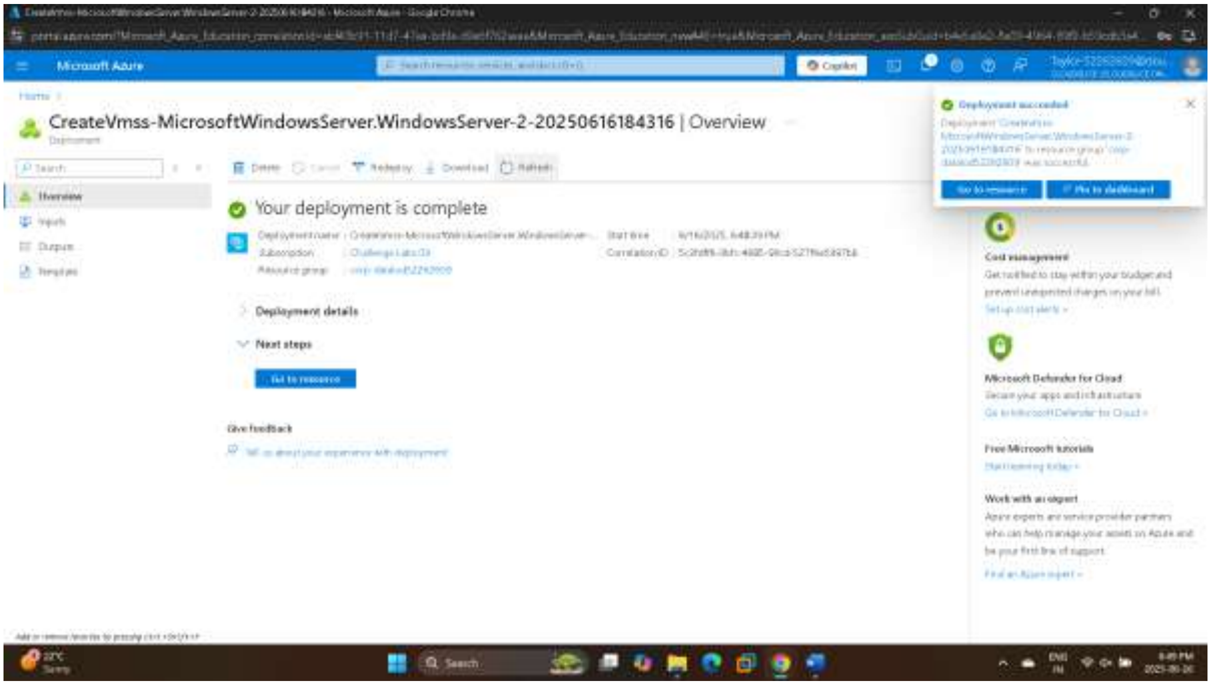
Validation passed

Basics

Subscription	Challenge Labs 09
Resource group	corp-datalod52262609
Virtual machine scale set name	vmfe52262609
Region	East US
Orchestration mode	Uniform
Availability zone	None
Image	Windows Server 2019 Datacenter - Gen2
Size	Standard B2s (2 vcpus, 4 GiB memory)
Scaling mode	Manually update the capacity
Instance count	2
Security type	Standard
Enable Hibernation	No
Username	Student

Spot

Azure Spot	No



CreateVmss-MicrosoftWindowsServer.WindowsServer-2-20250616184316 | Overview

Deployment

Your deployment is complete

Deployment name : CreateVmss-MicrosoftWindowsServer.WindowsServer-...
Subscription : Challenge Labs 09
Resource group : corp-datalod52262609
Start time : 6/16/2025, 6:48:39 PM
Correlation ID : 5c2fdff6-0bfc-4885-98cd-527f6e5897b6

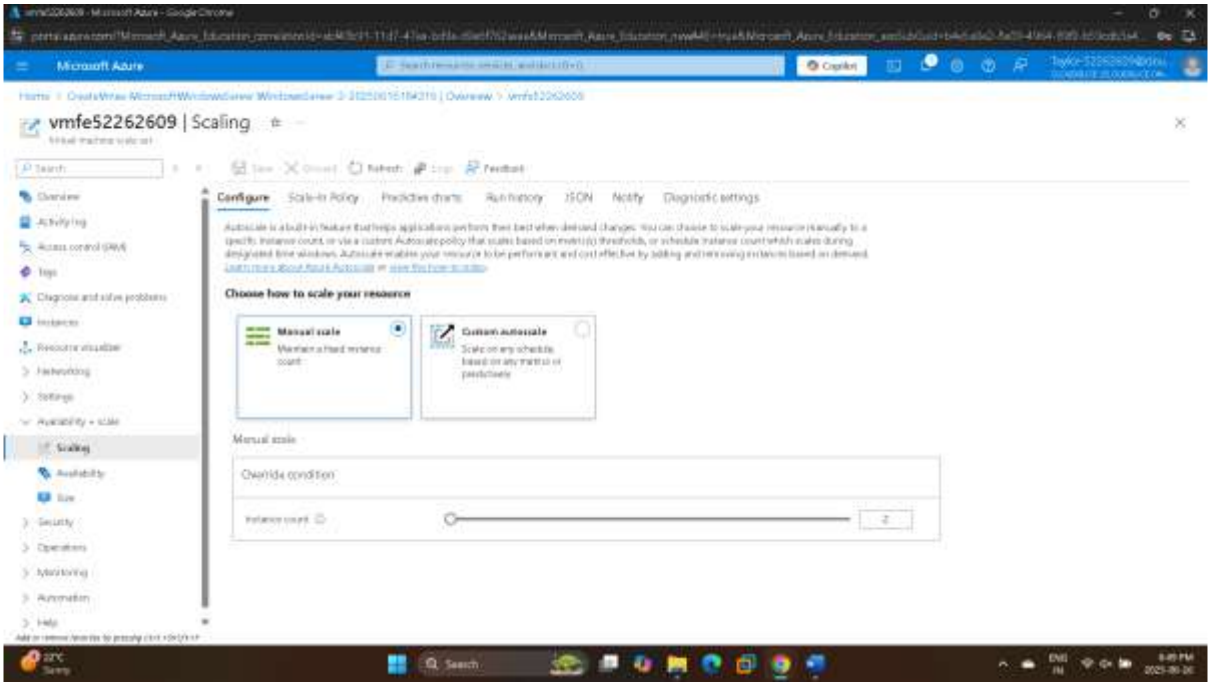
Deployment succeeded

Deployment 'CreateVmss-MicrosoftWindowsServer.WindowsServer-2-20250616184316' to resource group 'corp-datalod52262609' was successful.

Go to resource
Pin to dashboard
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 >

- Configure the vmfe52262609 scale set to use a Custom autoscale policy by using the values in the following table. For any property that is not specified, use the default value.

On the Deployment page, select Go to resource.
On the vmfe52262609 service menu, in Availability + scale, select Scaling.



vmfe52262609 | Scaling

Configure | Scale-In Policy | Predictive charts | Run history | JSON | Notify | Diagnostic settings

Choose how to scale your resource

● Manual scale — Maintain a fixed instance count

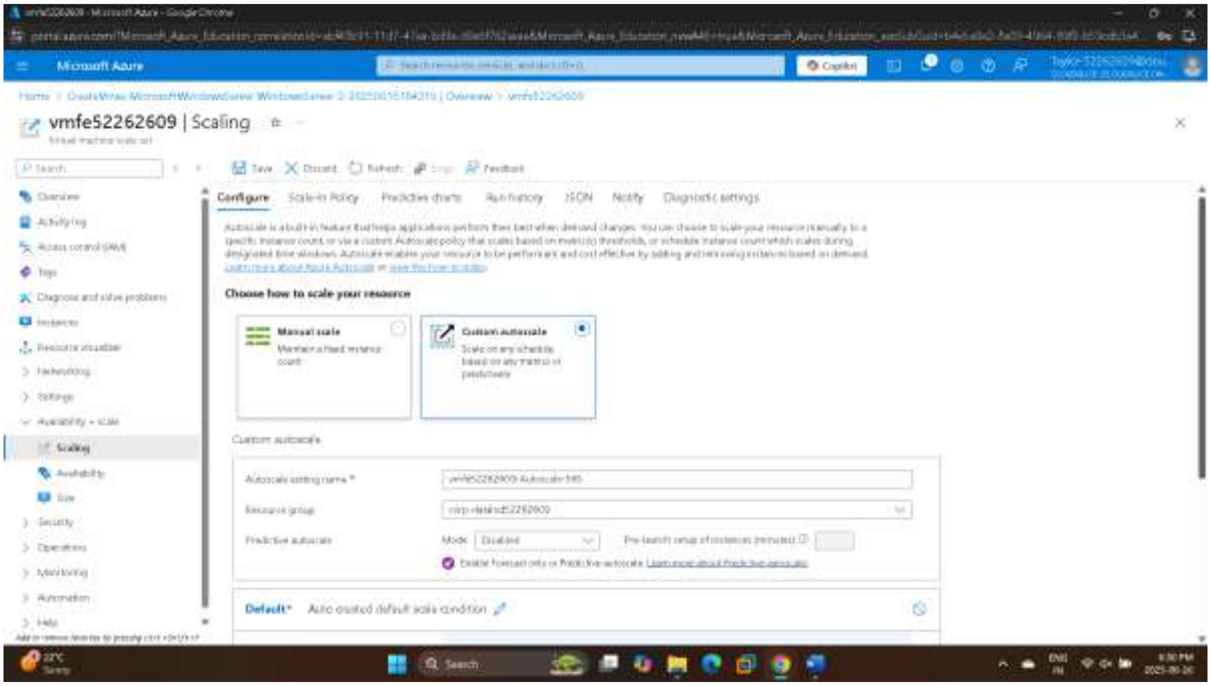
○ Custom autoscale — Scale on any schedule, based on any metrics or predictively

Manual scale

Override condition

Instance count: 2

On the Configure page, in Choose how to scale your resource, select Custom autoscale.



vmfe52262609 | Scaling

Configure | Scale-In Policy | Predictive charts | Run history | JSON | Notify | Diagnostic settings

Choose how to scale your resource

○ Manual scale — Maintain a fixed instance count

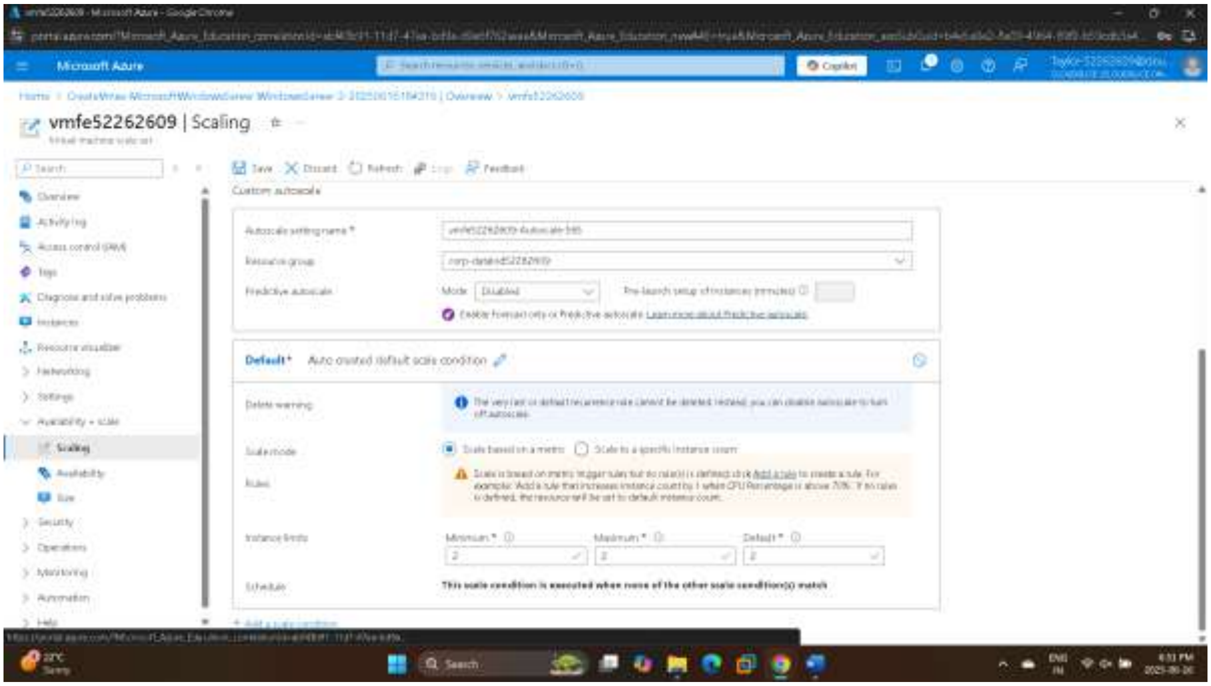
● Custom autoscale — Scale on any schedule, based on any metrics or predictively

Custom autoscale

Predictive autoscale: Mode: Disabled

Default* Auto created default scale condition

In Default, in Scale mode, select Scale based on a metric, and then in Rules, select the Add a rule link to add a scale-out rule.



vmfe52262609 | Scaling

Custom autoscale

Autoscale setting name * vmfe52262609-Autoscale-595

Resource group corp-datalod52262609

Predictive autoscale Mode Disabled

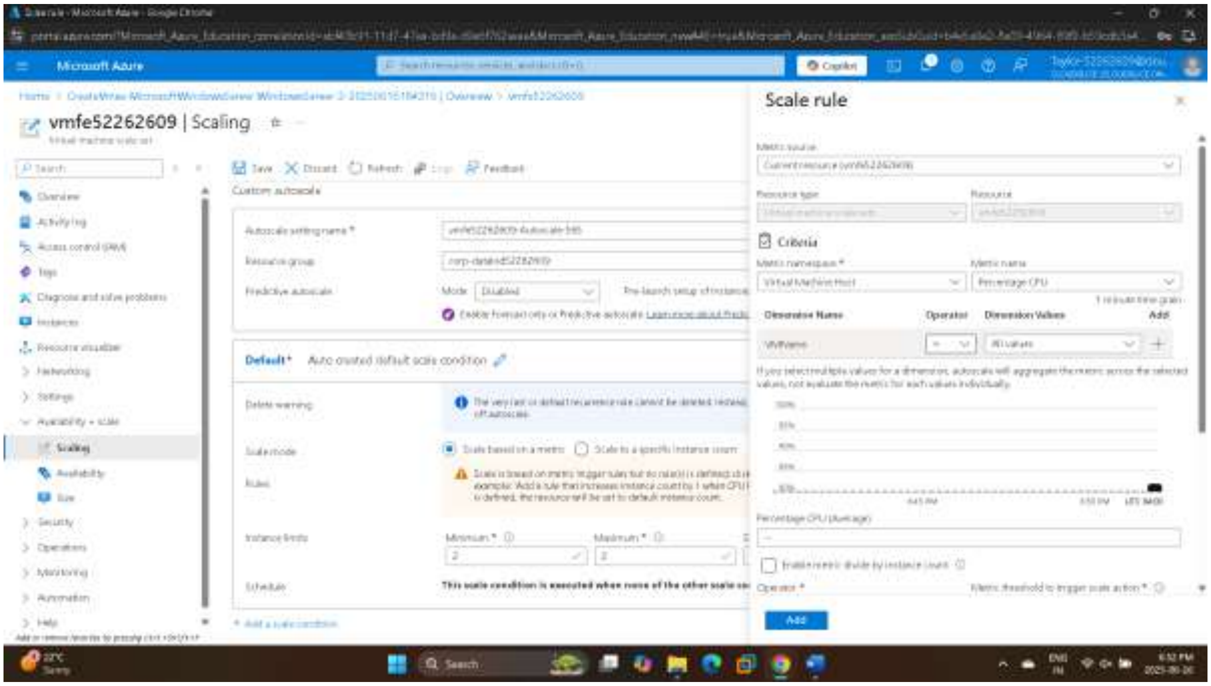
Default* Auto created default scale condition

Scale mode ● Scale based on a metric ○ Scale to a specific instance count

Instance limits Minimum * 2 Maximum * 2 Default * 2

Schedule This scale condition is executed when none of the other scale condition(s) match

On the Scale rule blade, in Metric name, ensure that Percentage CPU is selected, scroll down, in Operator, ensure that Greater than is selected, in Metric threshold to trigger scale action, enter 80, in Operation, ensure that Increase count by is selected, in instance count, ensure that 1 is entered, and then select Add.



Scale rule

Criteria

Metric namespace * Virtual Machine Host

Metric name Percentage CPU

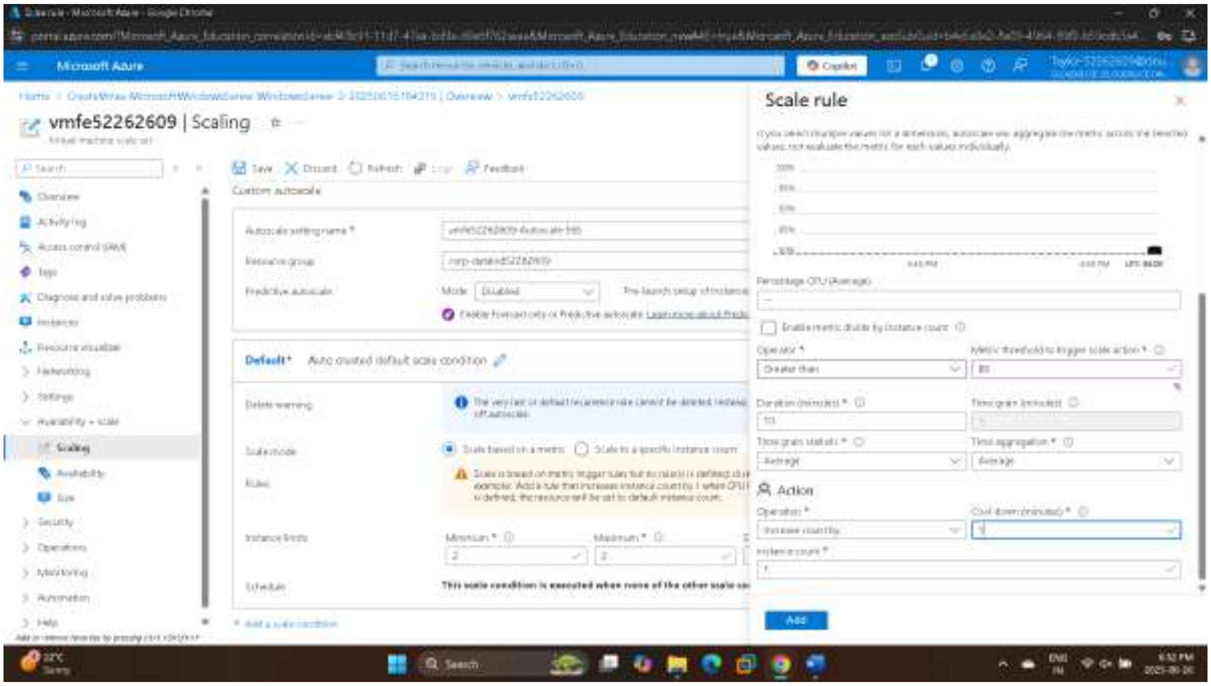
Dimension Name	Operator	Dimension Values	Add
VMName	=	All values	+

Percentage CPU (Average)

□ Enable metric divide by instance count

Operator *

Metric threshold to trigger scale action *



vmfe52262609 | Scaling

Scale rule

Percentage CPU (Average)

Operator: Greater than

Duration (minutes): 10

Time grain statistic: Average

Time aggregation: Average

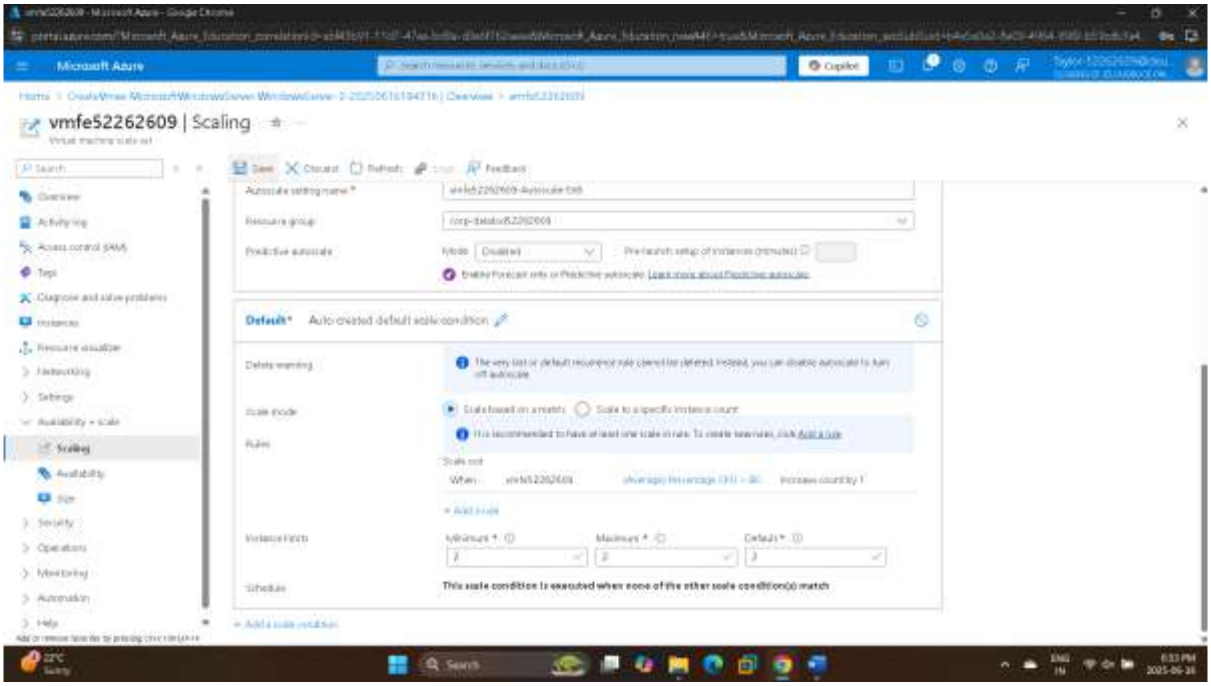
Action

Operation: Increase count by

Instance count: 1

In Instance limits, in Minimum, ensure that 2 is entered, in Maximum, enter 4, and then in Default ensure that 2 is entered.

On the Scaling page, on the command bar, select Save to update the autoscale configuration.



vmfe52262609 | Scaling

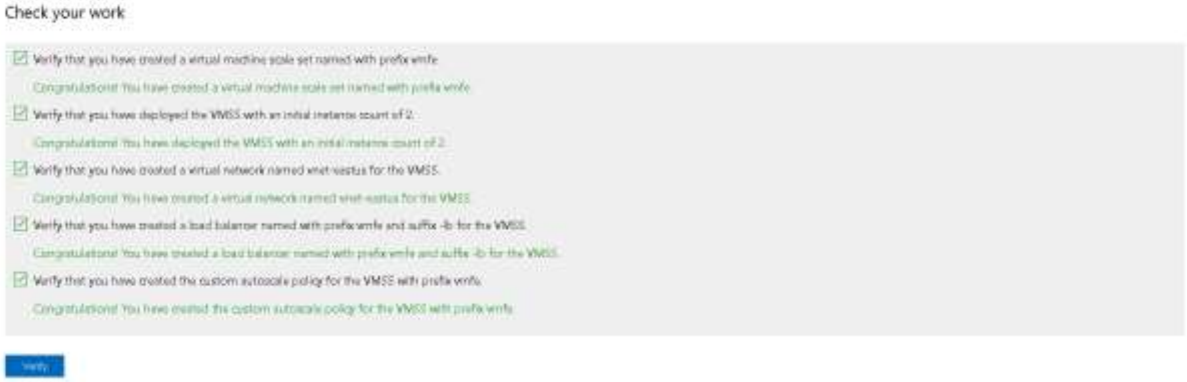
Default* Auto created default scale condition

Scale mode: ● Scale based on a metric ○ Scale to a specific instance count

Scale out

When vmfe52262609 (Average) Percentage CPU > 80 Increase count by 1

This scale condition is executed when none of the other scale condition(s) match



Check your work

☑ Verify that you have created a virtual machine scale set named with prefix vmfe

Congratulations! You have created a virtual machine scale set named with prefix vmfe

☑ Verify that you have deployed the VMSS with an initial instance count of 2.

Congratulations! You have deployed the VMSS with an initial instance count of 2.

☑ Verify that you have created a virtual network named vnet-eastus for the VMSS.

Congratulations! You have created a virtual network named vnet-eastus for the VMSS.

☑ Verify that you have created a load balancer named with prefix vmfe and suffix -lb for the VMSS.

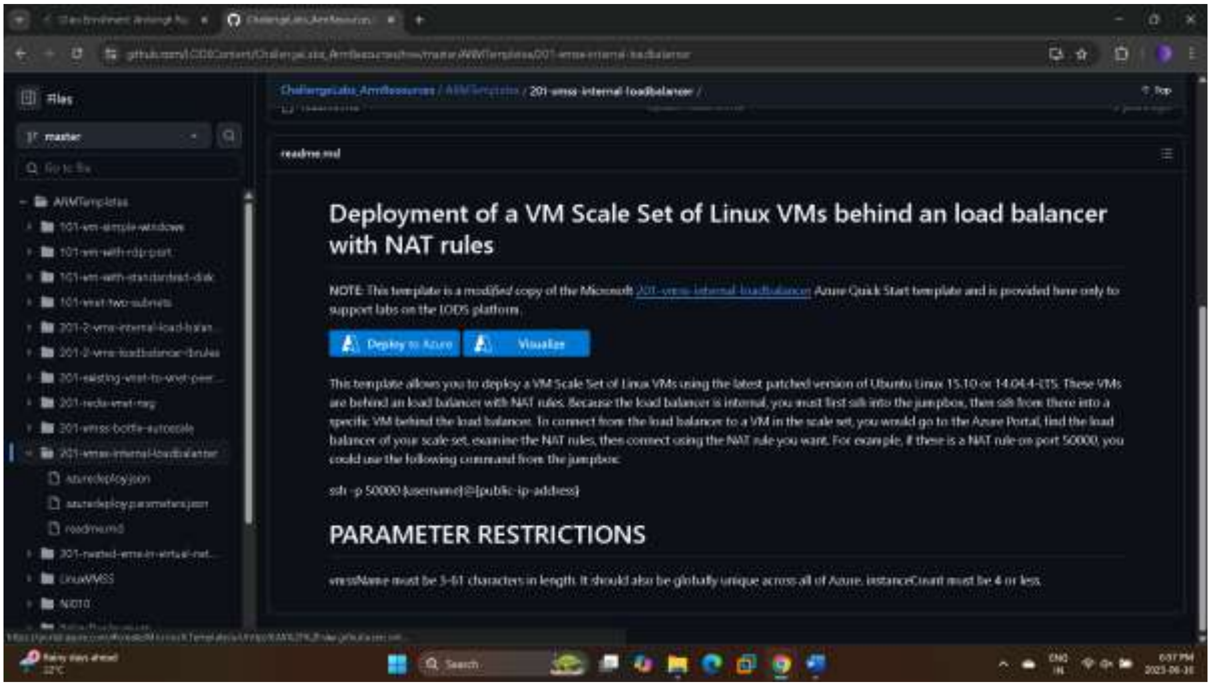
Congratulations! You have created a load balancer named with prefix vmfe and suffix -lb for the VMSS.

☑ Verify that you have created the custom autoscale policy for the VMSS with prefix vmfe.

Congratulations! You have created the custom autoscale policy for the VMSS with prefix vmfe.

Create an Azure virtual machine scale set for an app server tier

In a new browser window, view the https://github.com/LODSContent/ChallengeLabs_ArmResources/tree/master/ARMTemplates/201-vmss-internal-loadbalancer sample template on GitHub, and then select **Deploy to Azure** to deploy the template to Azure.



ChallengeLabs_ArmResources / ARMTemplates / 201-vmss-internal-loadbalancer /
Top
Files
master
Go to file
ARMTemplates
101-vm-simple-windows
101-vm-with-rdp-port
101-vm-with-standardssd-disk
101-vnet-two-subnets
201-2-vms-internal-load-balan...
201-2-vms-loadbalancer-lbrules
201-existing-vnet-to-vnet-peer...
201-redis-vnet-nsg
201-vmss-bottle-autoscale
201-vmss-internal-loadbalancer
azuredeploy.json
azuredeploy.parameters.json
readme.md
201-nested-vms-in-virtual-net...
LinuxVMSS
NJD10
readme.md
Deploy to Azure
Visualize
Search

Deployment of a VM Scale Set of Linux VMs behind an load balancer with NAT rules

NOTE: This template is a *modified* copy of the Microsoft 201-vmss-internal-loadbalancer Azure Quick Start template and is provided here only to support labs on the LODS platform.

This template allows you to deploy a VM Scale Set of Linux VMs using the latest patched version of Ubuntu Linux 15.10 or 14.04.4-LTS. These VMs are behind an load balancer with NAT rules. Because the load balancer is internal, you must first ssh into the jumpbox, then ssh from there into a specific VM behind the load balancer. To connect from the load balancer to a VM in the scale set, you would go to the Azure Portal, find the load balancer of your scale set, examine the NAT rules, then connect using the NAT rule you want. For example, if there is a NAT rule on port 50000, you could use the following command from the jumpbox:

ssh -p 50000 {username}@{public-ip-address}

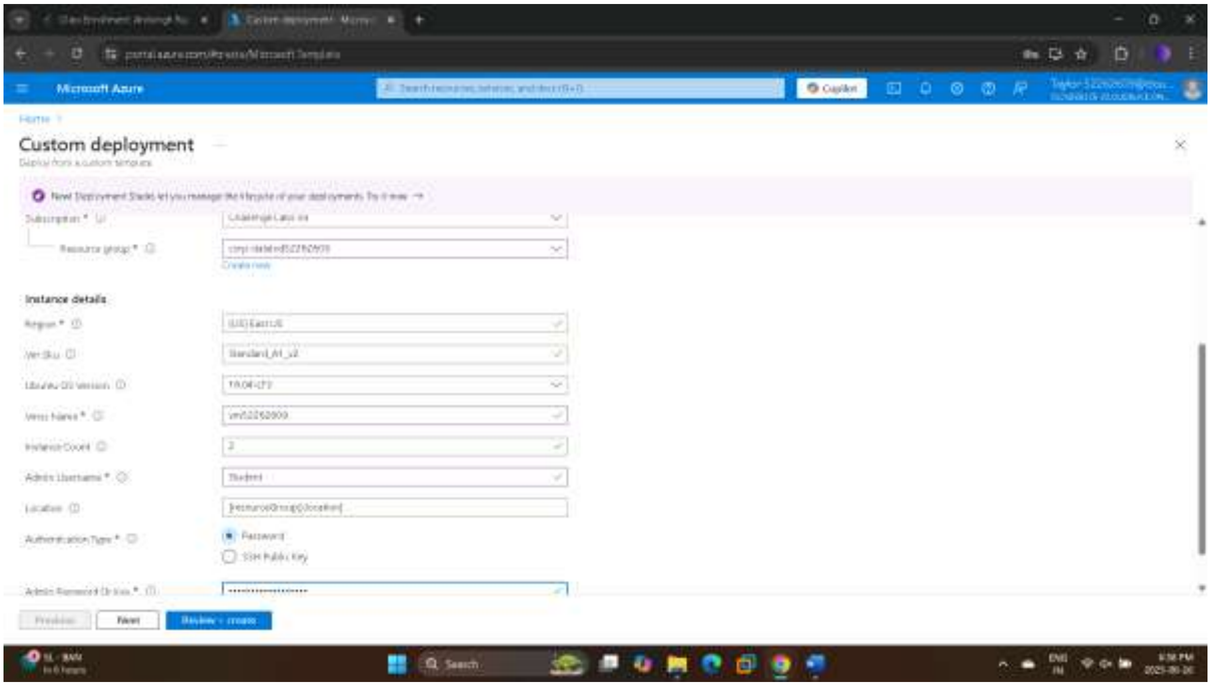
PARAMETER RESTRICTIONS

vmssName must be 3-61 characters in length. It should also be globally unique across all of Azure. instanceCount must be 4 or less.

On the Custom deployment blade, on the Basics page, in Project details, in Resource group, select **corp-datalod52262609**.

In Instance details, in Vm Sku, ensure that Standard_A1_v2 is selected, in Ubuntu OS Version, ensure that **16.04-LTS** is selected, in Vmss Name, enter vm52262609, and then in Instance Count, ensure that 2 is entered.

In Admin Username, enter Student, in Authentication Type, ensure that **Password** is selected, and then in Admin Password Or Key, enter Azure!kAgH7e!0D$q!.


Custom deployment

Deploy from a custom template

Subscription * : [illegible]

Resource group * : corp-datalod52262909

Create new

Instance details

Region * : (US) East US

Vm Sku : Standard_A1_v2

Ubuntu OS Version : 18.04-LTS

Vmss Name * : vm52262909

Instance Count : 2

Admin Username * : Student

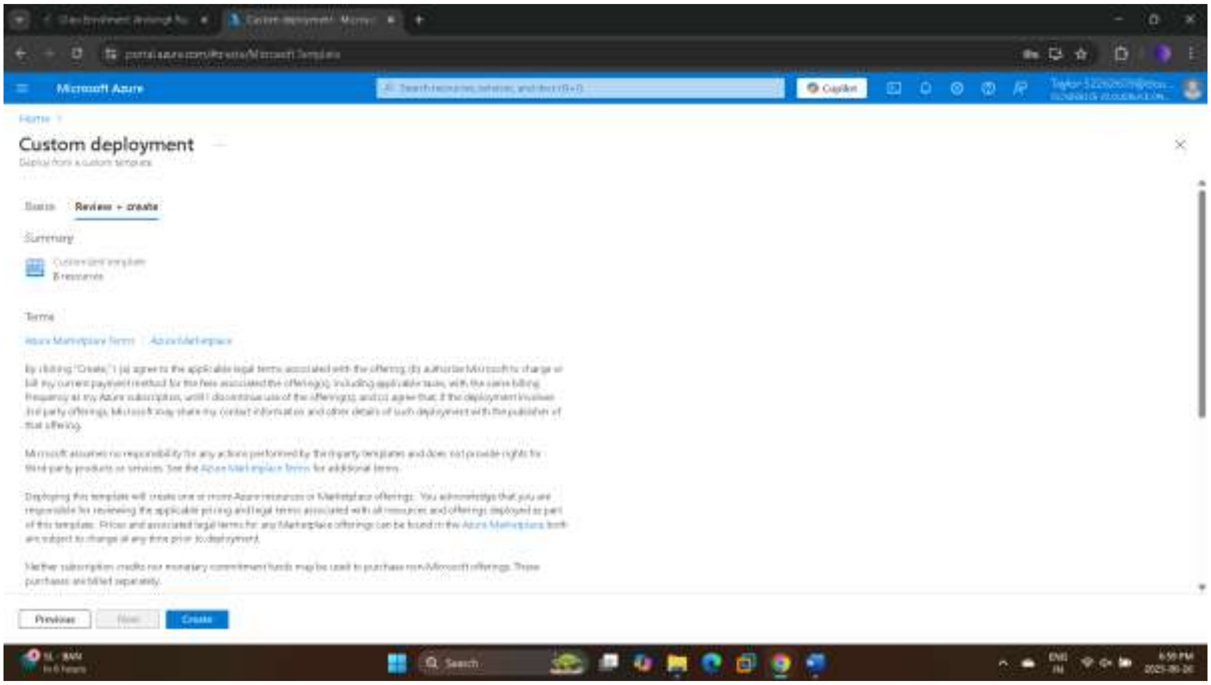
Location : [resourceGroup().location]

Authentication Type * : ● Password ○ SSH Public Key

Admin Password Or Key * : ••••••••••••••••••

Microsoft Azure
Home >
New! Deployment Stacks let you manage the lifecycle of your deployments. Try it now →
Previous
Next
Review + create

On the Custom deployment blade, select **Review + create**, and then select **Create** to deploy the virtual machine scale set.


Custom deployment

Deploy from a custom template

Summary

Customized template
8 resources

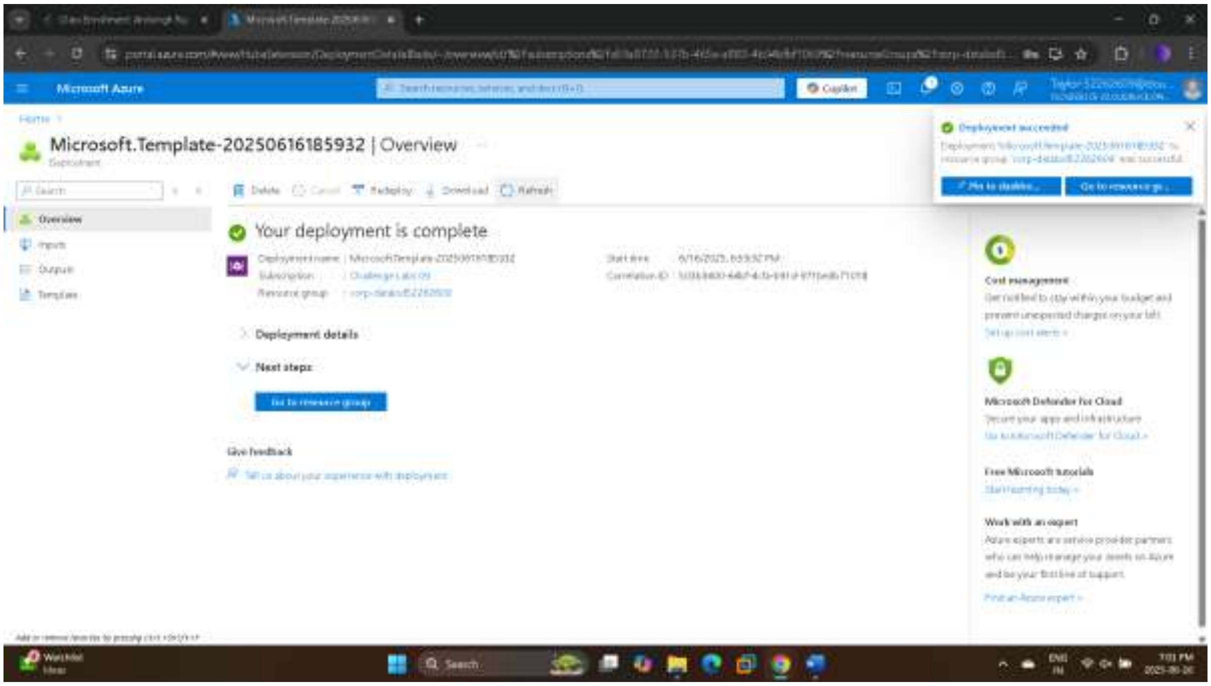
Terms

By clicking "Create," I (a) agree to the applicable legal terms associated with the offering; (b) authorize Microsoft to charge or bill my current payment method for the fees associated the offering(s), including applicable taxes, with the same billing frequency as my Azure subscription, until I discontinue use of the offering(s); and (c) agree that, if the deployment involves 3rd party offerings, Microsoft may share my contact information and other details of such deployment with the publisher of that offering.

Microsoft assumes no responsibility for any actions performed by third-party templates and does not provide rights for third-party products or services. See the Azure Marketplace Terms for additional terms.

Deploying this template will create one or more Azure resources or Marketplace offerings. You acknowledge that you are responsible for reviewing the applicable pricing and legal terms associated with all resources and offerings deployed as part of this template. Prices and associated legal terms for any Marketplace offerings can be found in the Azure Marketplace; both are subject to change at any time prior to deployment.

Neither subscription credits nor monetary commitment funds may be used to purchase non-Microsoft offerings. These purchases are billed separately.



Microsoft.Template-20250616185932 | Overview

Your deployment is complete

Deployment details

Next steps

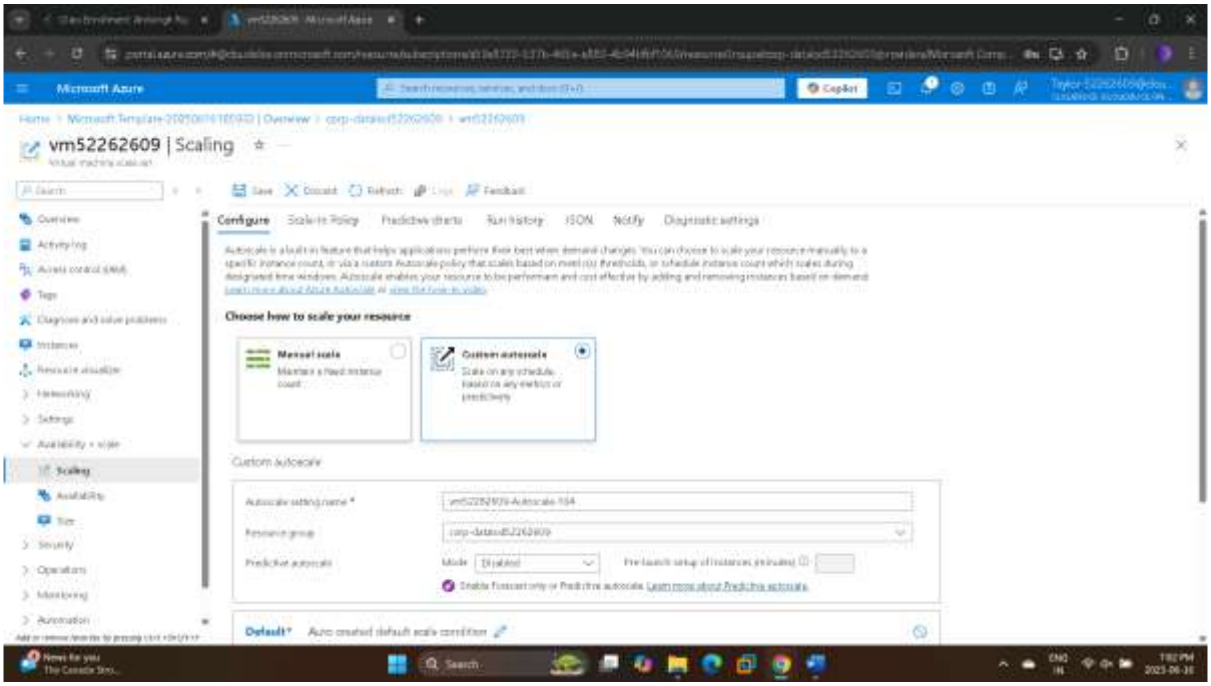
Give feedback

Configure the **vm52262609** scale set to use a **Custom autoscale** policy by using the values in the following table. For any property that is not specified, use the default value.

On the Azure portal menu, select **All resources**, and then select **vm52262609** virtual machine scale set.

On the vm52262609 service menu, in Availability + scale, select **Scaling**.

On the Scaling page, in Choose how to scale your resource, select **Custom autoscale**.



vm52262609 | Scaling

Choose how to scale your resource

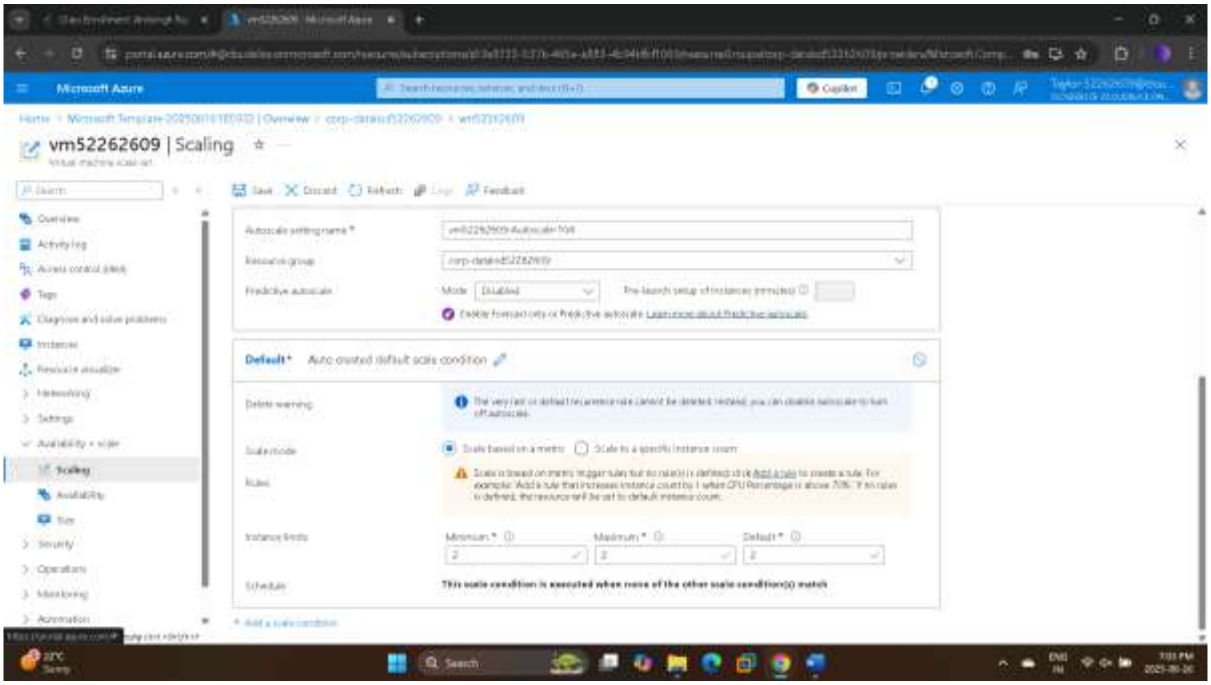
- ○ Manual scale
- ● Custom autoscale

Custom autoscale

Resource group: corp-datalod52262609

Default* Auto created default scale condition

In Default, in Scale mode, select **Scale based on a metric**, and then in Rules, select the **Add a rule** link to add a scale out rule.



vm52262609 | Scaling

Save | Discard | Refresh | Logs | Feedback

Autoscale setting name *

Resource group

Predictive autoscale: Mode: Disabled

Default* Auto created default scale condition

Delete warning

Scale mode: ● Scale based on a metric ○ Scale to a specific instance count

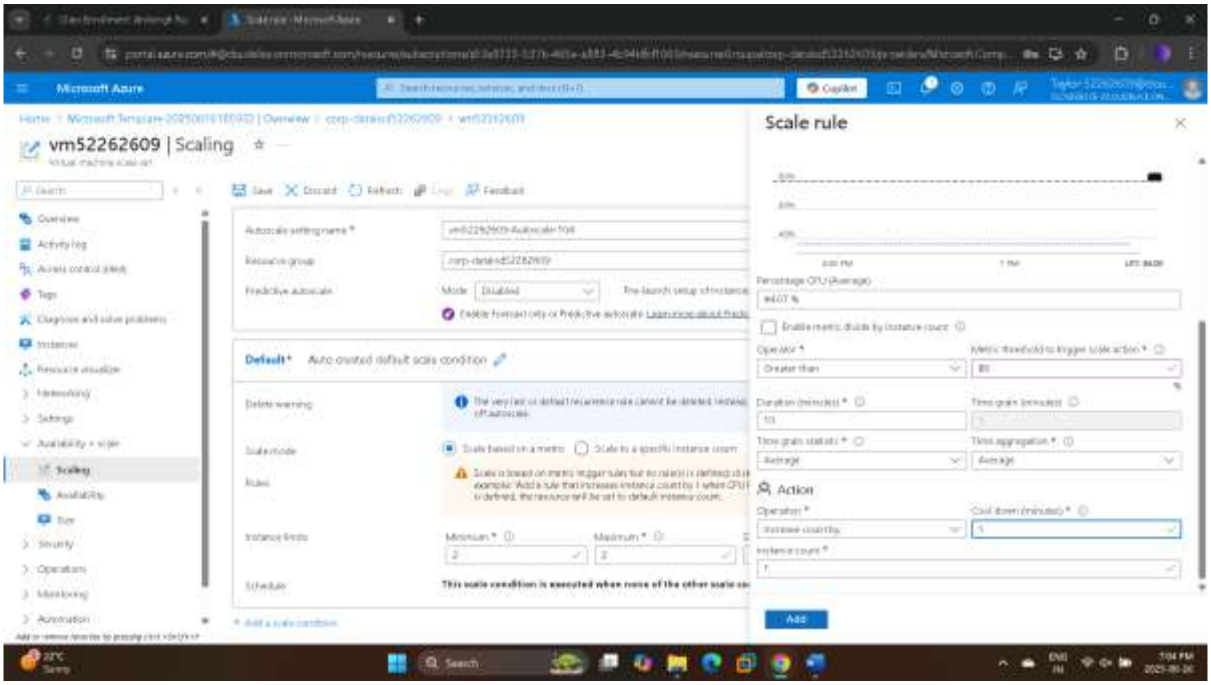
Rules

Instance limits: Minimum * 2, Maximum * 2, Default * 2

Schedule: This scale condition is executed when none of the other scale condition(s) match

+ Add a scale condition

On the Scale rule blade, in Metric name, ensure that **Percentage CPU** is selected, scroll down, in Operator, ensure that **Greater than** is selected, in Metric threshold to trigger scale action, enter 80, in Operation, ensure that **Increase count by** is selected, in instance count, ensure that 1 is entered, and then select **Add**.



Scale rule

Percentage CPU (Average)

□ Enable metric divide by instance count

Operator *: Greater than

Metric threshold to trigger scale action *: 80

Duration (minutes) *: 10

Time grain (minutes)

Time grain statistic *: Average

Time aggregation *: Average

Action

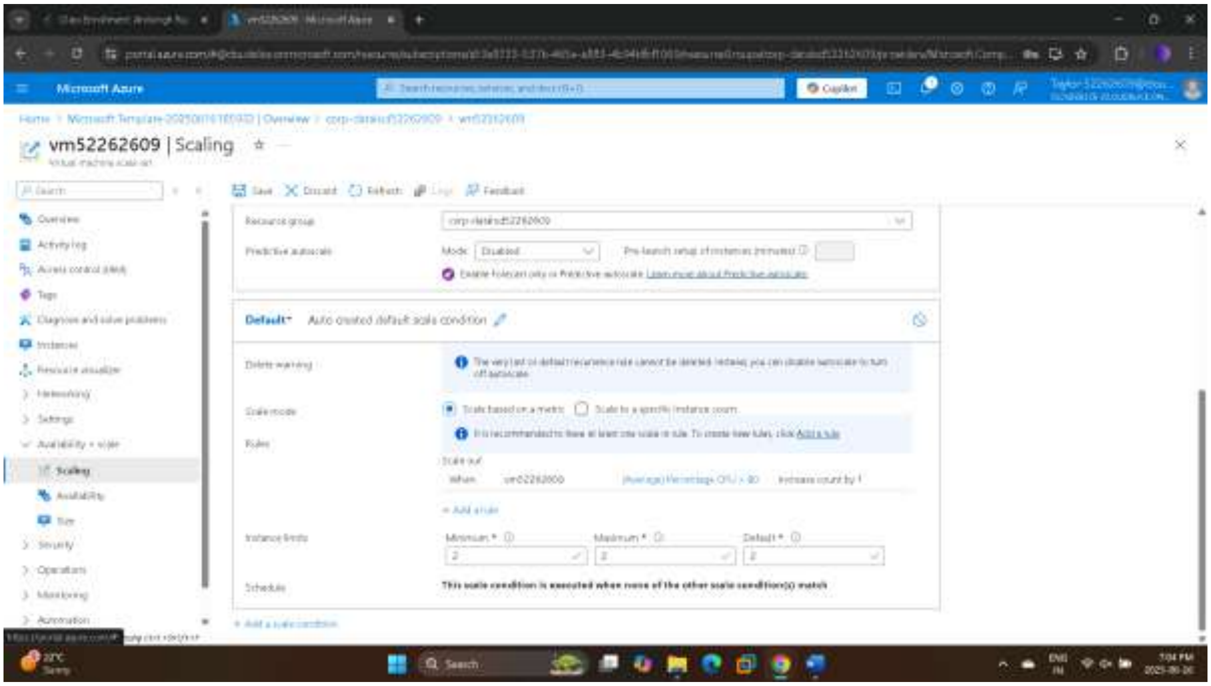
Operation *: Increase count by

Cool down (minutes) *: 5

Instance count *: 1

Add

In Rules, select the **Add a rule** link again to add a scale in rule.



vm52262609 | Scaling

Resource group: corp-datalod52262609

Predictive autoscale: Mode: Disabled

Default* Auto created default scale condition

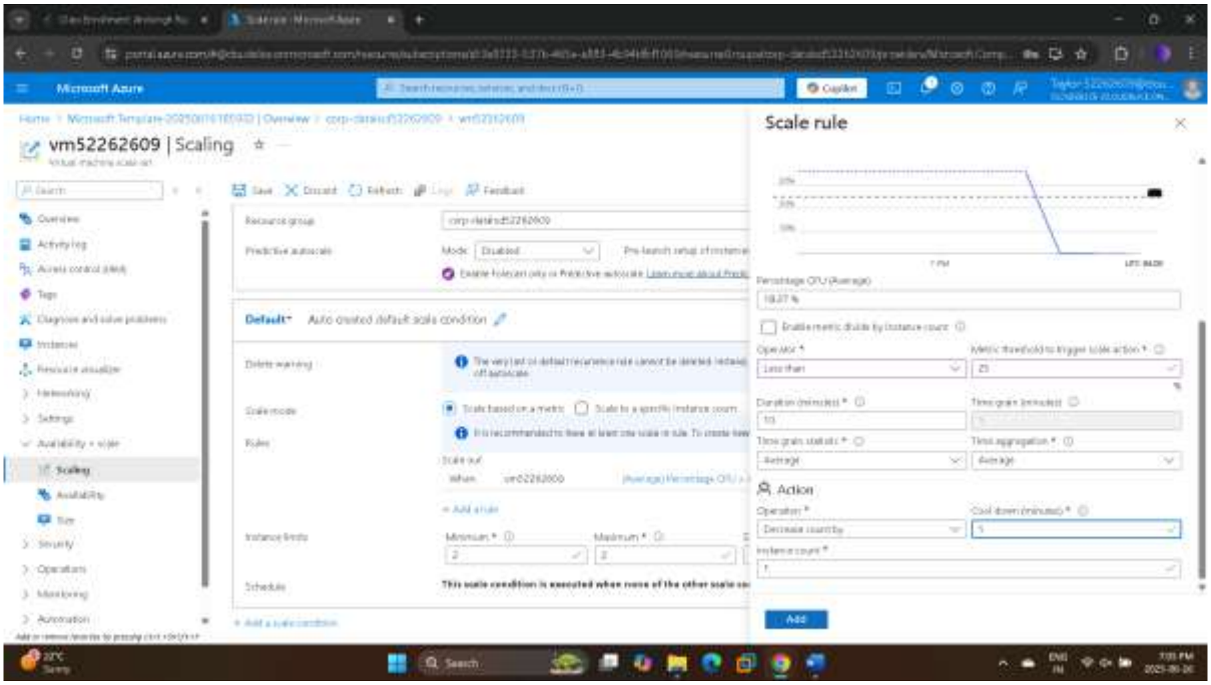
Scale mode: ● Scale based on a metric ○ Scale to a specific instance count

Rules: Scale out: When vm52262609 (Average) Percentage CPU > 80 Increase count by 1

Instance limits: Minimum * 2 Maximum * 2 Default * 2

Schedule: This scale condition is executed when none of the other scale condition(s) match

On the Scale rule blade, in Metric name, ensure that **Percentage CPU** is selected, scroll down, in Operator, select **Less than**, in Metric threshold to trigger scale action, enter 25, in Operation, ensure that **Decrease count by** is selected, in instance count, ensure that 1 is entered, and then select **Add**.



Scale rule

Percentage CPU (Average): 18.27 %

☐ Enable metric divide by instance count

Operator *: Less than

Metric threshold to trigger scale action *: 25

Duration (minutes) *: 10

Time grain statistic *: Average

Time aggregation *: Average

Action

Operation *: Decrease count by

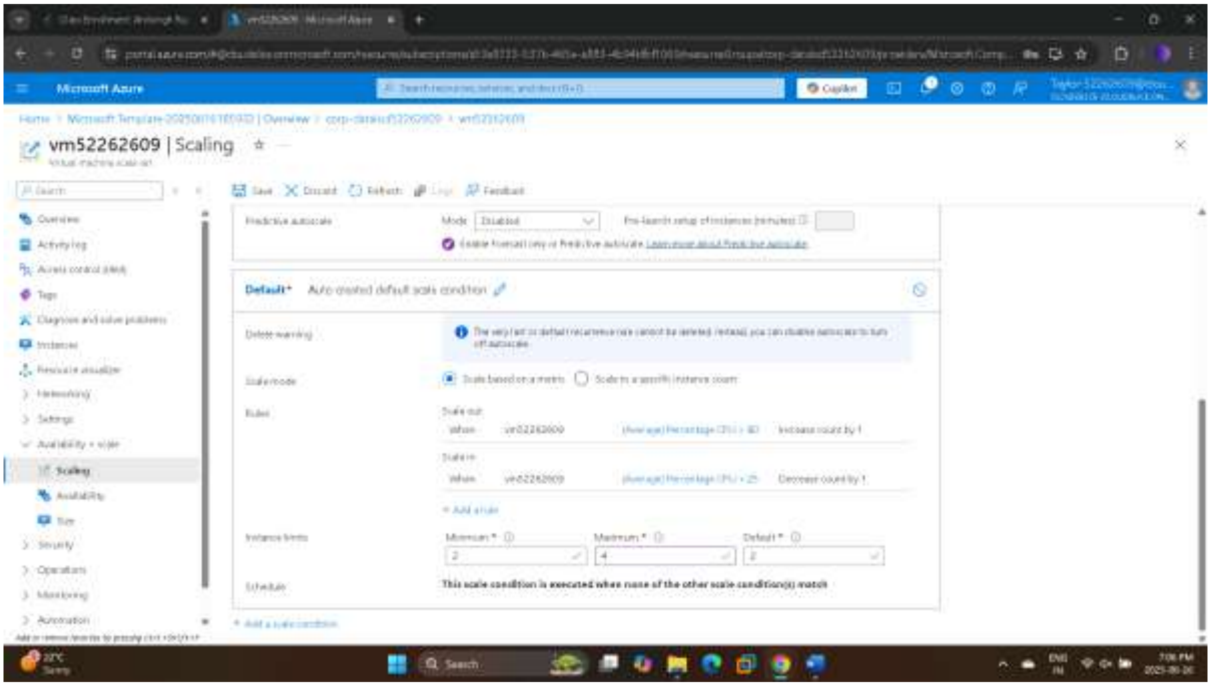
Cool down (minutes) *: 5

Instance count *: 1

Add

In Instance limits, in Minimum, ensure that 2 is entered, in Maximum, enter 4, and then in Default ensure that 2 is entered.

On the Scaling page, on the command bar, select **Save** to update the autoscale configuration.



vm52262609 | Scaling

Virtual machine scale set

Predictive autoscale — Mode: Disabled

Default* Auto created default scale condition

Scale mode: ● Scale based on a metric ○ Scale to a specific instance count

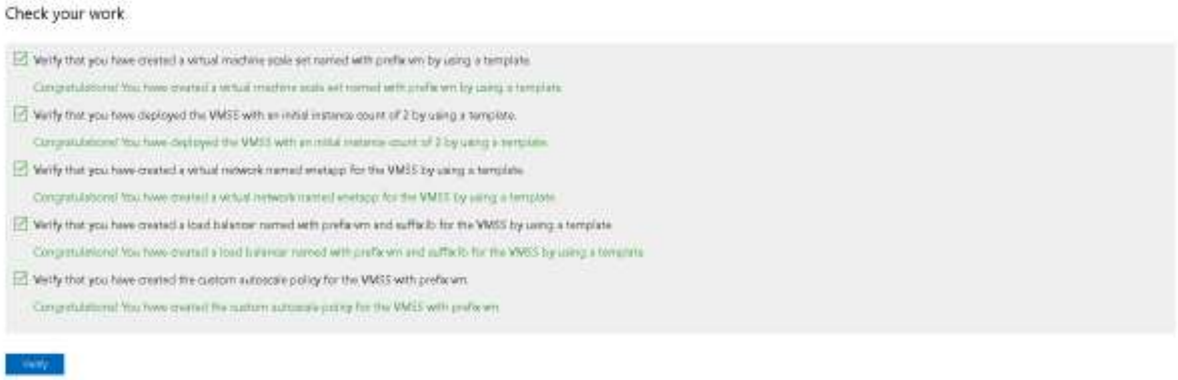
Rules

Scale out — When vm52262609 (Average) Percentage CPU > 80 Increase count by 1

Scale in — When vm52262609 (Average) Percentage CPU < 25 Decrease count by 1

Instance limits — Minimum * 2 Maximum * 4 Default * 2

Schedule — This scale condition is executed when none of the other scale condition(s) match



Check your work

☑ Verify that you have created a virtual machine scale set named with prefix vm by using a template

Congratulations! You have created a virtual machine scale set named with prefix vm by using a template.

☑ Verify that you have deployed the VMSS with an initial instance count of 2 by using a template.

Congratulations! You have deployed the VMSS with an initial instance count of 2 by using a template.

☑ Verify that you have created a virtual network named vnetapp for the VMSS by using a template

Congratulations! You have created a virtual network named vnetapp for the VMSS by using a template.

☑ Verify that you have created a load balancer named with prefix vm and suffix lb for the VMSS by using a template

Congratulations! You have created a load balancer named with prefix vm and suffix lb for the VMSS by using a template.

☑ Verify that you have created the custom autoscale policy for the VMSS with prefix vm.

Congratulations! You have created the custom autoscale policy for the VMSS with prefix vm.

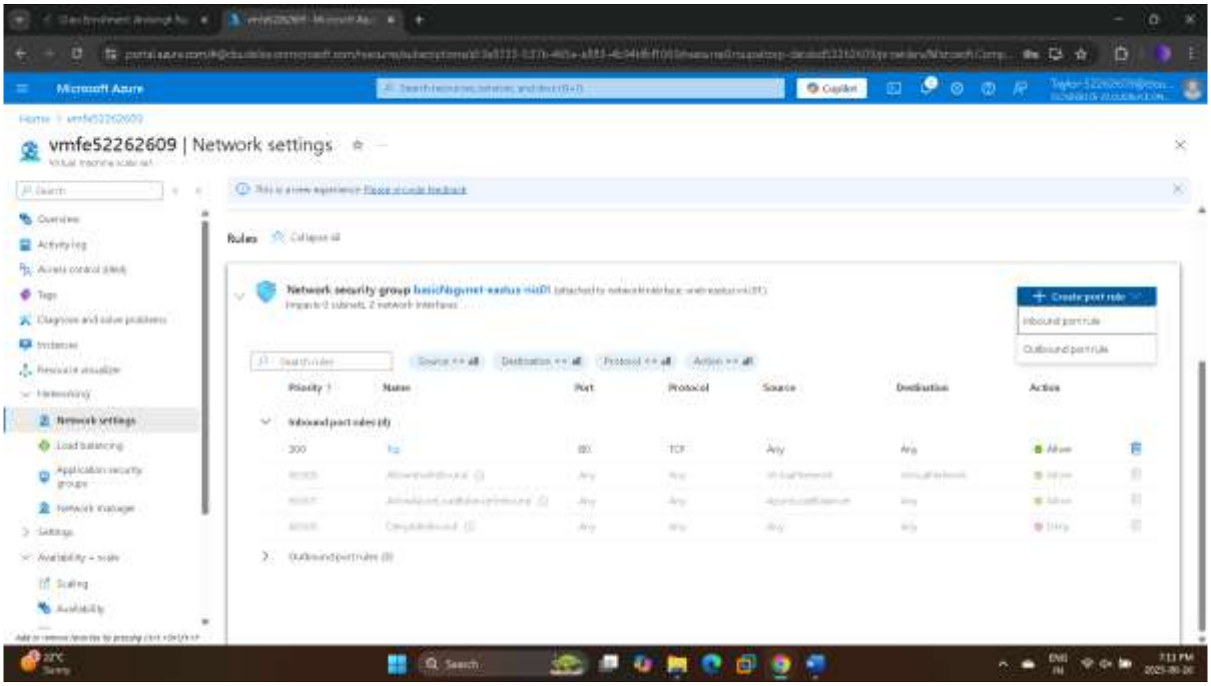
- Verify connectivity to the virtual machine scale set for the web server tier

For the **vmfe52262609** virtual machine scale set, add a network security group (NSG) **inbound port rule** named Allow_RDP_HTTP_HTTPS to allow RDP, HTTP, and HTTPS traffic for the front-end web server tier.

On the Azure portal menu, select **All resources**, and then select the **vmfe52262609** virtual machine scale set.

On the vmfe52262609 service menu, in Networking, select **Network settings**.

On the Network settings page, select **Create port rule**, and then select **Inbound port rule**.



vmfe52262609 | Network settings

Virtual machine scale set

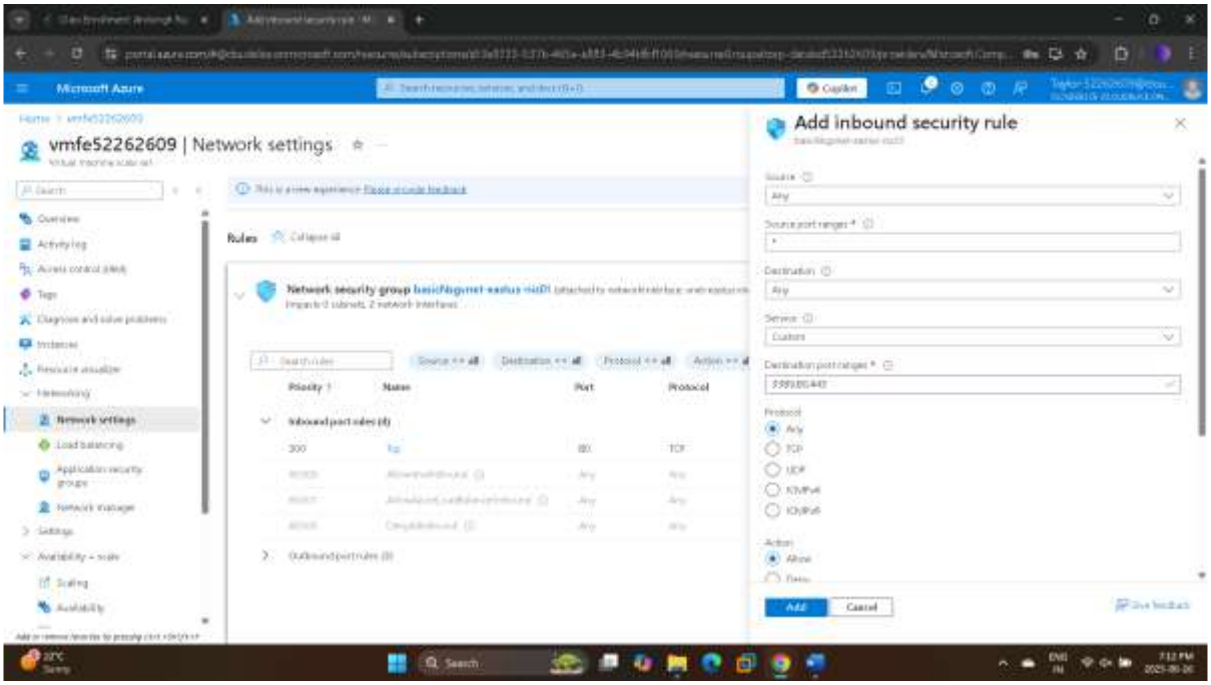
Rules

Network security group basicNsgvnet-eastus-nic01

Impacts 0 subnets, 2 network interfaces

Priority ↑	Name	Port	Protocol	Source	Destination	Action
Inbound port rules (4)						
300	[illegible]	80	TCP	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny
Outbound port rules (3)						

On the Add inbound security rule pane, in Destination port ranges, enter 3389,80,443, in Name, enter Allow_RDP_HTTP_HTTPS, and then select **Add** to add the rule.



Add inbound security rule

Source: Any

Source port ranges *: *

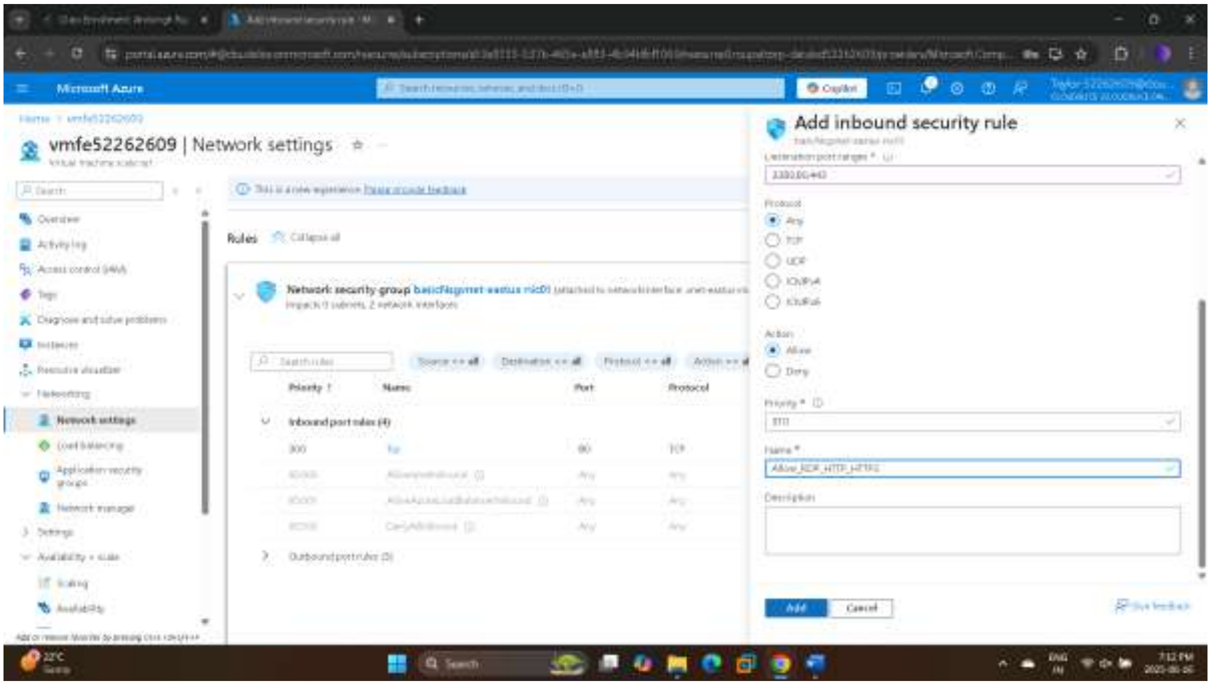
Destination: Any

Service: Custom

Destination port ranges *: 3389,80,443

Protocol
- ● Any
- ○ TCP
- ○ UDP
- ○ ICMPv4
- ○ ICMPv6

Action
- ● Allow
- ○ Deny



vmfe52262609 | Network settings

Virtual machine scale set

Add inbound security rule

basicNsgvnet-eastus-nic01

Destination port ranges *

3389,80,443

Protocol

● Any

○ TCP

○ UDP

○ ICMPv4

○ ICMPv6

Action

● Allow

○ Deny

Priority *

310

Name *

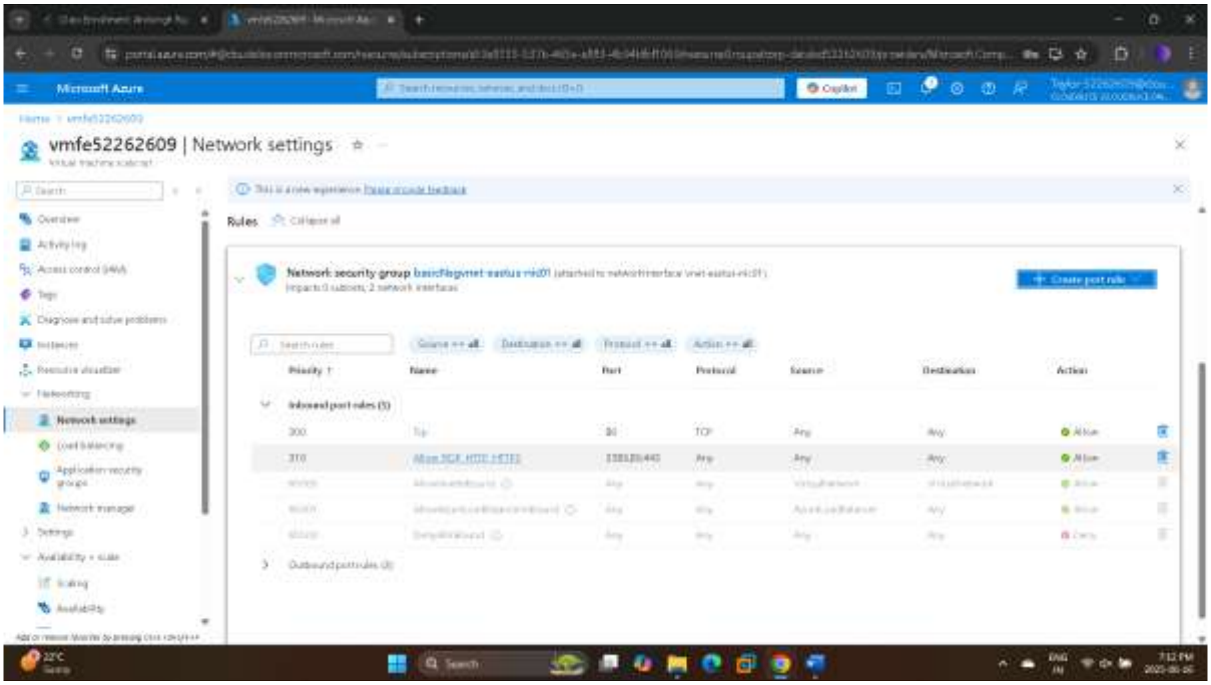
Allow_RDP_HTTP_HTTPS

Description

Network security group basicNsgvnet-eastus-nic01 (attached to network interface vnet-eastus-nic01)

Impacts 0 subnets, 2 network interfaces

Priority ↑	Name	Port	Protocol
Inbound port rules (4)			
300	Tcp	80	TCP
65000	AllowVnetInBound	Any	Any
65001	AllowAzureLoadBalancerInBound	Any	Any
65500	DenyAllInBound	Any	Any
Outbound port rules (3)			



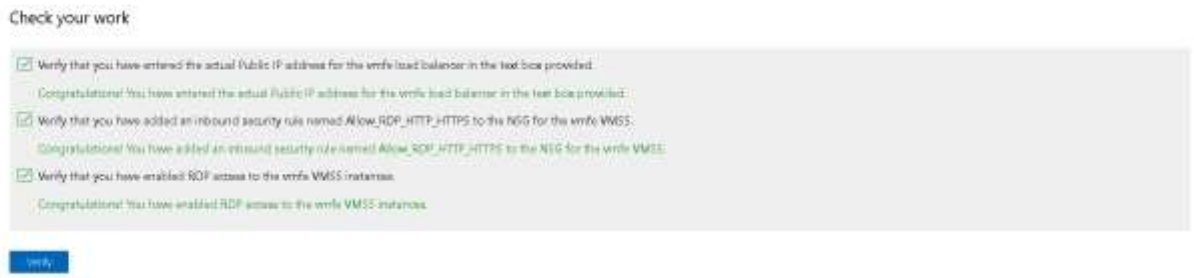
vmfe52262609 | Network settings

Virtual machine scale set

Network security group basicNsgvnet-eastus-nic01 (attached to network interface vnet-eastus-nic01)

Impacts 0 subnets, 2 network interfaces

Priority ↑	Name	Port	Protocol	Source	Destination	Action
Inbound port rules (5)						
300	Tcp	80	TCP	Any	Any	Allow
310	Allow_RDP_HTTP_HTTPS	3389,80,443	Any	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny
Outbound port rules (3)						



Check your work

☑ Verify that you have entered the actual Public IP address for the vmfe load balancer in the text box provided.

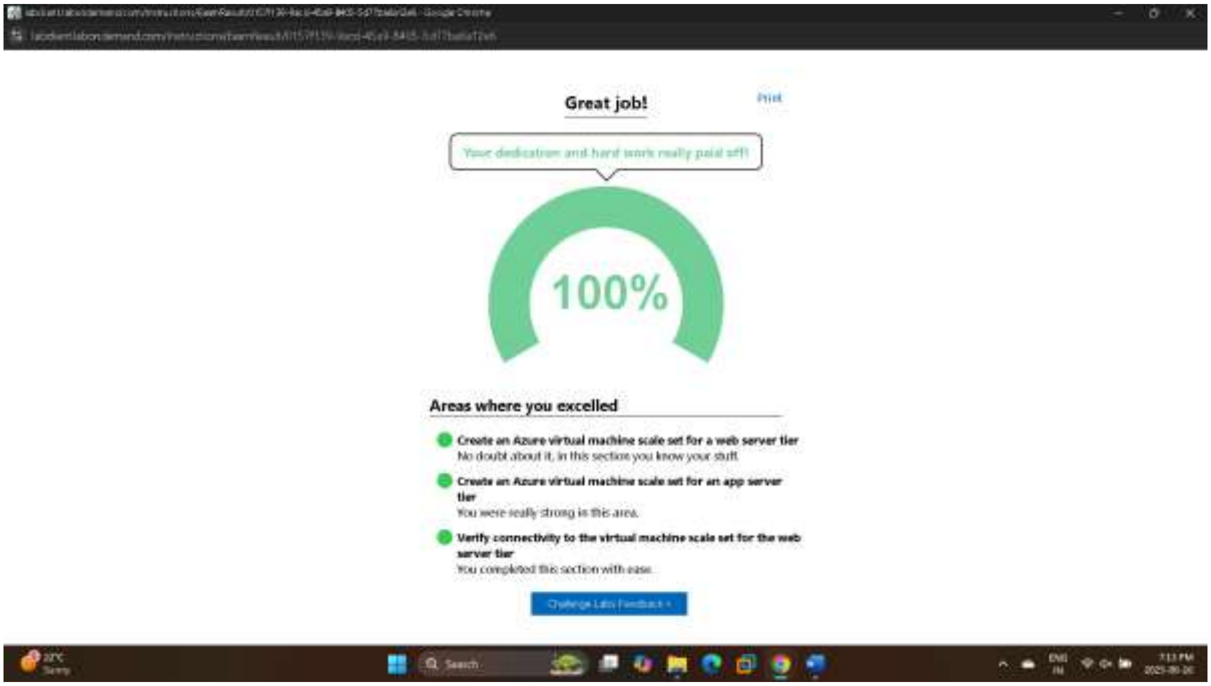
Congratulations! You have entered the actual Public IP address for the vmfe load balancer in the text box provided.

☑ Verify that you have added an inbound security rule named Allow_RDP_HTTP_HTTPS to the NSG for the vmfe VMSS.

Congratulations! You have added an inbound security rule named Allow_RDP_HTTP_HTTPS to the NSG for the vmfe VMSS.

☑ Verify that you have enabled RDP access to the vmfe VMSS instances.

Congratulations! You have enabled RDP access to the vmfe VMSS instances.



Great job!

Print

Your dedication and hard work really paid off!

100%

Areas where you excelled

- Create an Azure virtual machine scale set for a web server tier
  No doubt about it, in this section you know your stuff.
- Create an Azure virtual machine scale set for an app server tier
  You were really strong in this area.
- Verify connectivity to the virtual machine scale set for the web server tier
  You completed this section with ease.

Learning & Opinion

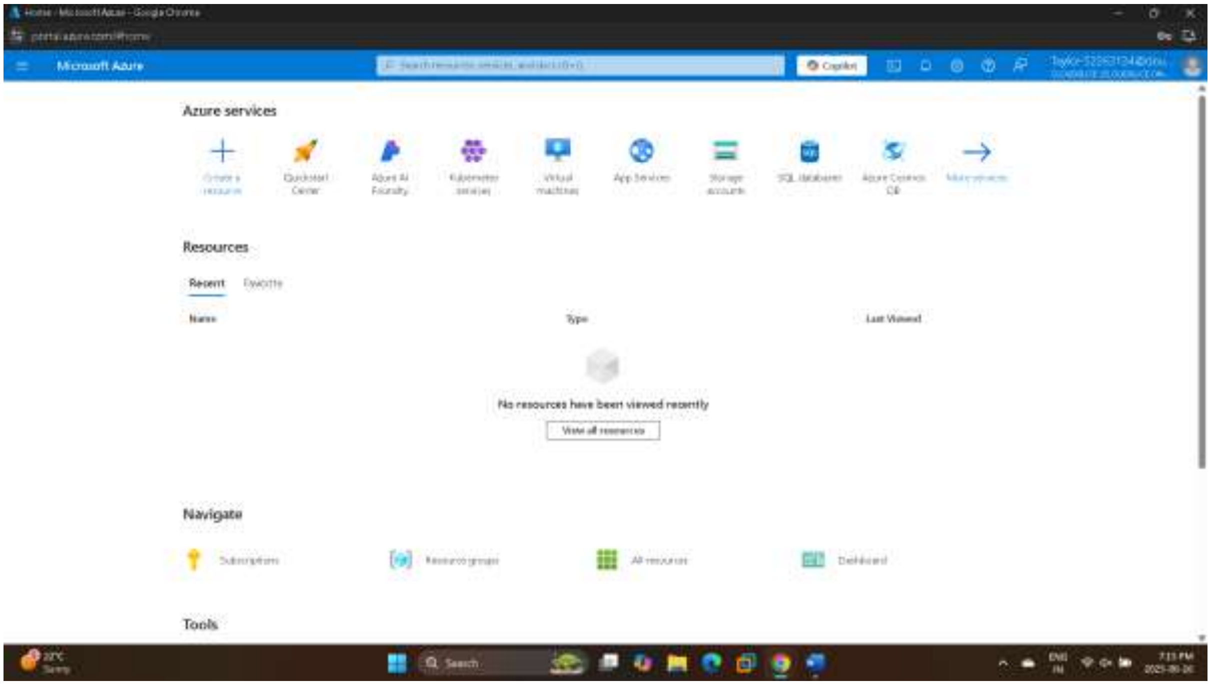
Virtual Machine Scale Sets (VMSS) are used to deploy and manage identical, scalable virtual machines automatically.By scaling out or in based on metrics like CPU usage, they assist applications in staying responsive and available under fluctuating loads. By dynamically modifying the number of virtual machine instances, autoscale rules guarantee effective resource utilization. Incoming traffic is distributed evenly among instances through integration with load balancers. Designing highly available and economical applications requires an understanding of orchestration modes, instance limits, and scaling techniques. Large-scale services and stateless workloads are best suited for VMSS.

Task05: Enable VM Backup by Using Recovery Services Vault

- Create an Azure virtual machine that contains SQL Server

Create an Azure virtual machine (VM) named VM1 by using the values in the following table. For any property that is not specified, use the default values.

On the Microsoft Azure home page, in Azure services, select **Create a resource**.

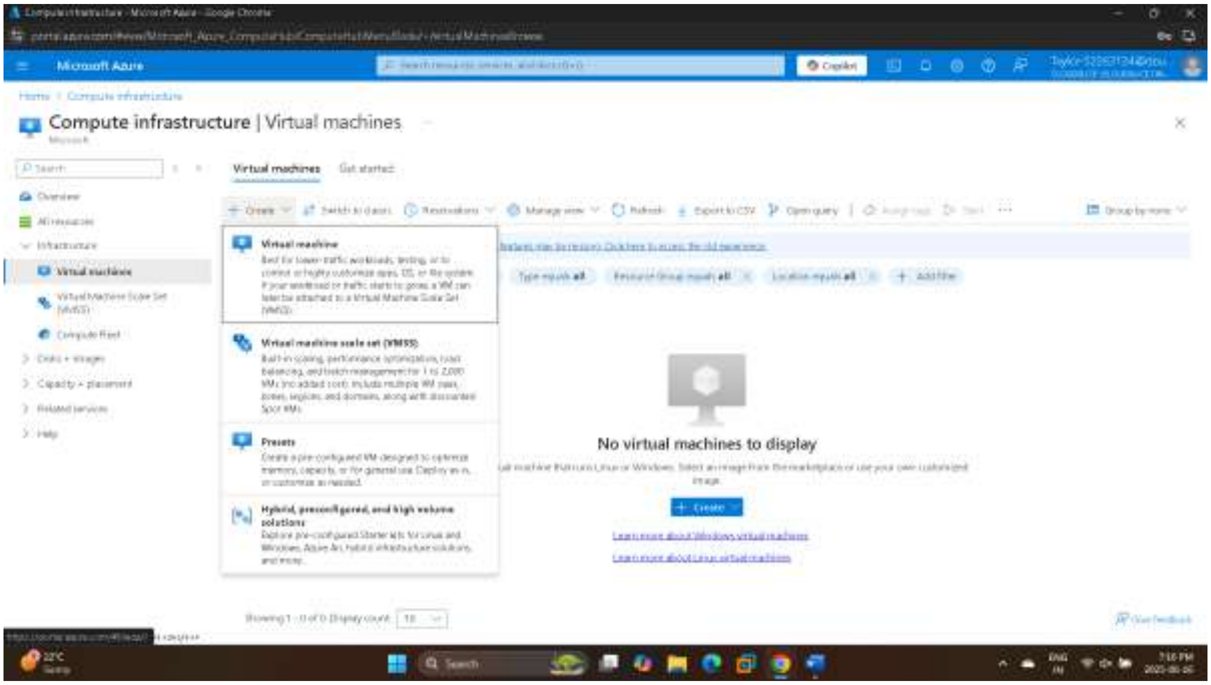


No resources have been viewed recently

In the Azure Marketplace, search for and select virtual machine.

On the Marketplace blade, select the **Virtual machine** tile.

On the Virtual machine blade, select **Create**.



No virtual machines to display

On the Create a virtual machine blade, in Project details, in Resource group, select **corp-datalod52263124**.

In Instance details, in Virtual machine name, enter VM1.

In Region, ensure that **(US) East US** is selected.

In Security type, select **Standard**.

In Image, select **See all images**.

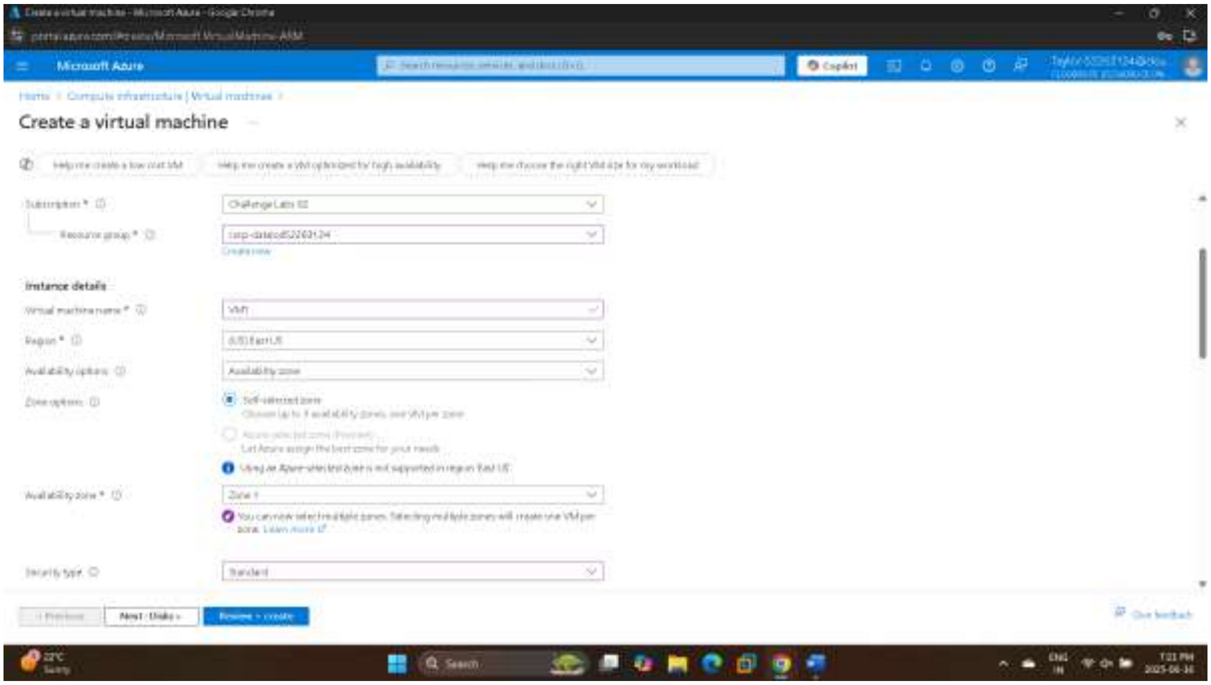
On the Marketplace blade, search for SQL Server 2017 on Windows Server 2019.

On the **SQL Server 2017 on Windows Server 2019** tile, select **Select**, and then select **Free SQL Server License: SQL Server 2017 Developer on Windows Server 2019 - x64 Gen2**.

In Size, select **See all sizes**, search for and select B2ms, and then select **Select**.

In Administrator account, in Username, enter testuser, and then in Password and Confirm password, enter Pa55w.rd1234.

In Inbound port rules, in Public inbound ports, ensure that **Allow selected ports** is selected and in Select inbound ports, ensure **RDP 3389** is selected.



Create a virtual machine

Subscription * : Challenge Labs 02

Resource group * : [illegible]

Instance details

Virtual machine name * : VM1

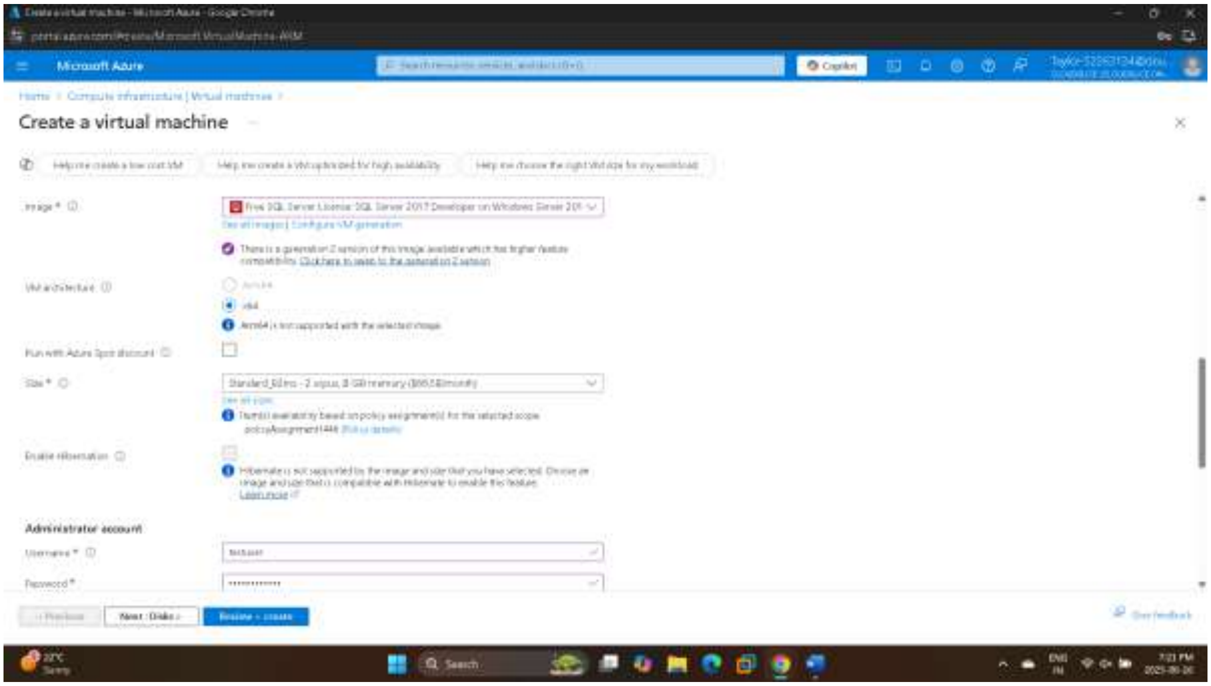
Region * : (US) East US

Availability options : Availability zone

Zone options : ● Self-selected zone

Availability zone * : Zone 1

Security type : Standard



Create a virtual machine

Image * : Free SQL Server License: SQL Server 2017 Developer on Windows Server 201

There is a generation 2 version of this image available which has higher feature compatibility. Click here to swap to the generation 2 version

VM architecture: ○ Arm64 ● x64

Arm64 is not supported with the selected image.

Run with Azure Spot discount: □

Size * : Standard_B2ms - 2 vcpus, 8 GiB memory ($65.58/month)

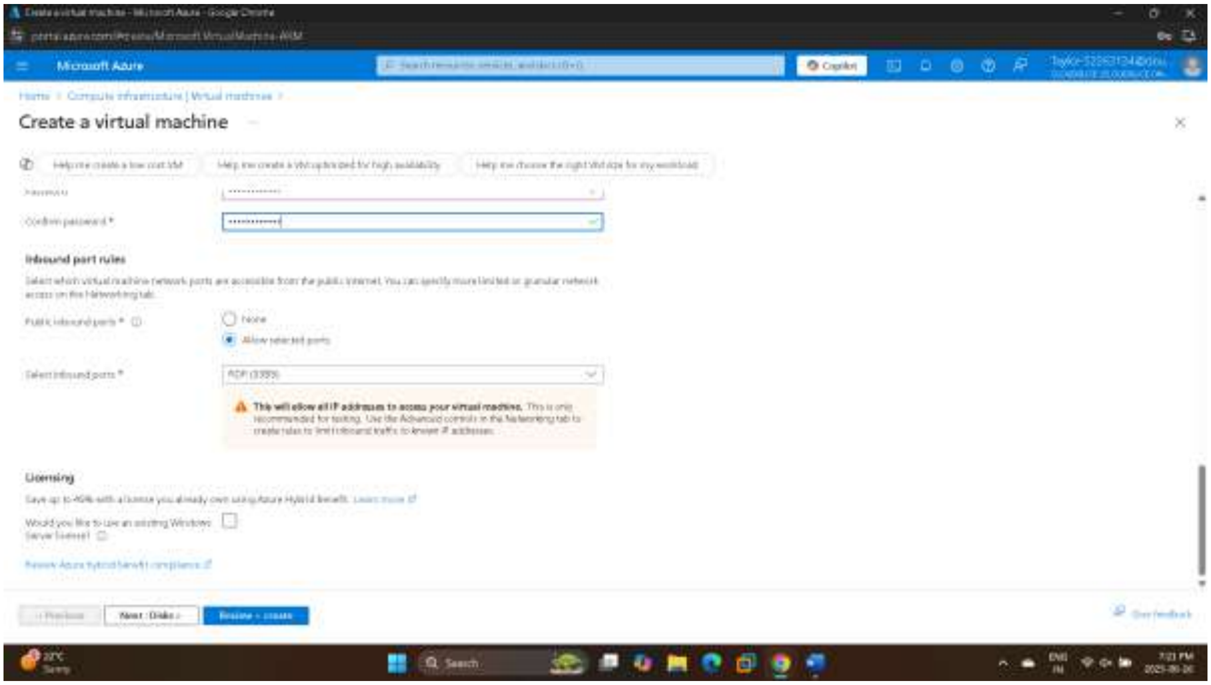
Enable hibernation: □

Hibernate is not supported by the image and size that you have selected. Choose an image and size that is compatible with Hibernate to enable this feature. Learn more

Administrator account

Username * : testuser

Password * : ••••••••••••



Create a virtual machine

Confirm password * : ••••••••••••

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports * : ○ None ● Allow selected ports

Select inbound ports * : RDP (3389)

This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

Licensing

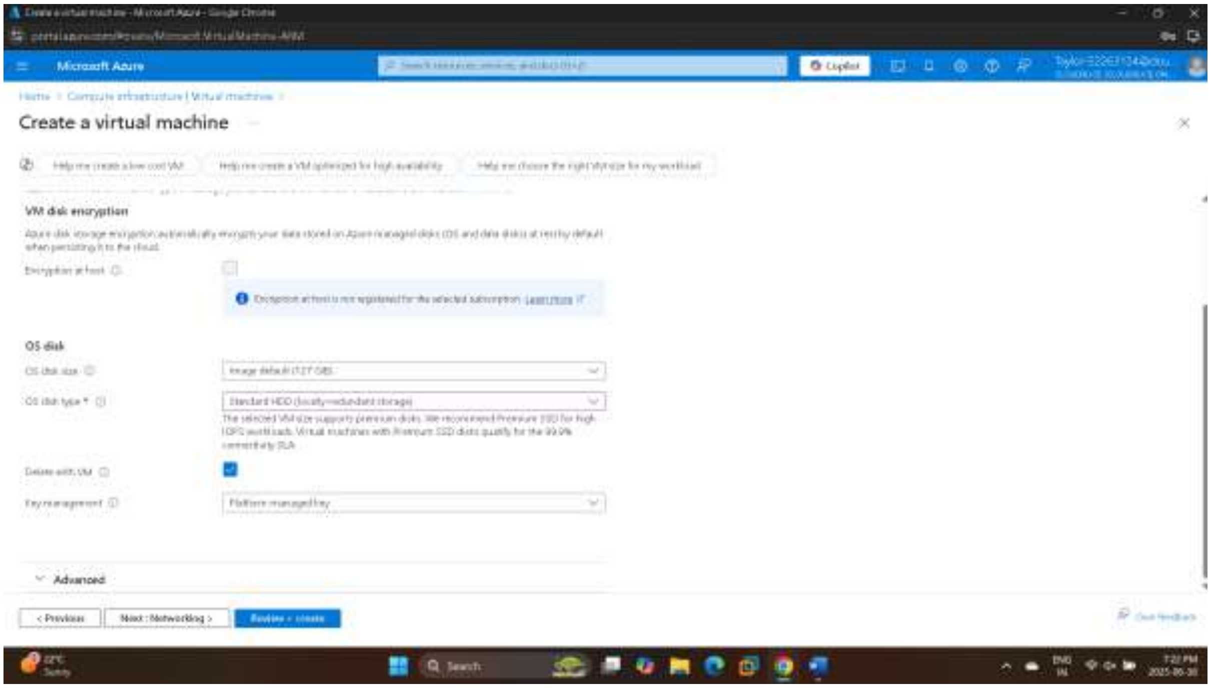
Save up to 49% with a license you already own using Azure Hybrid Benefit. Learn more

Would you like to use an existing Windows Server license? □

Review Azure hybrid benefit compliance

Select **Next: Disks**.

On the Disks page, in OS disk, in OS disk type, select **Standard HDD**, and then select the **Monitoring** tab.



Create a virtual machine

VM disk encryption

Encryption at host □

Encryption at host is not registered for the selected subscription. Learn more

OS disk

OS disk size: Image default (127 GiB)

OS disk type *: Standard HDD (locally-redundant storage)

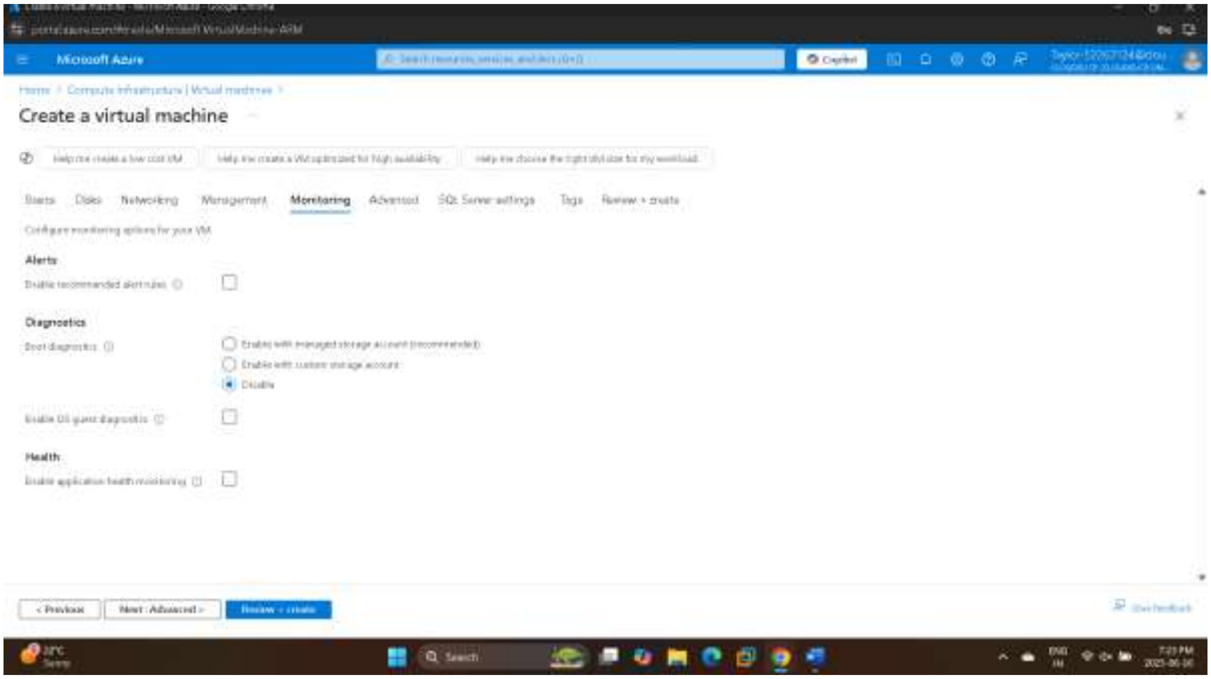
The selected VM size supports premium disks. We recommend Premium SSD for high IOPS workloads. Virtual machines with Premium SSD disks qualify for the 99.9% connectivity SLA.

Delete with VM ☑

Key management: Platform-managed key

Microsoft Azure
Home > Compute infrastructure | Virtual machines >
Help me create a low cost VM
Help me create a VM optimized for high availability
Help me choose the right VM size for my workload
Advanced
< Previous
Next : Networking >
Review + create

On the Monitoring page, in Diagnostics, in Boot diagnostics, select **Disable**, and then select the **SQL Server settings** tab.



Create a virtual machine

Configure monitoring options for your VM

Alerts

Enable recommended alert rules □

Diagnostics

Boot diagnostics

○ Enable with managed storage account (recommended)

○ Enable with custom storage account

● Disable

Enable OS guest diagnostics □

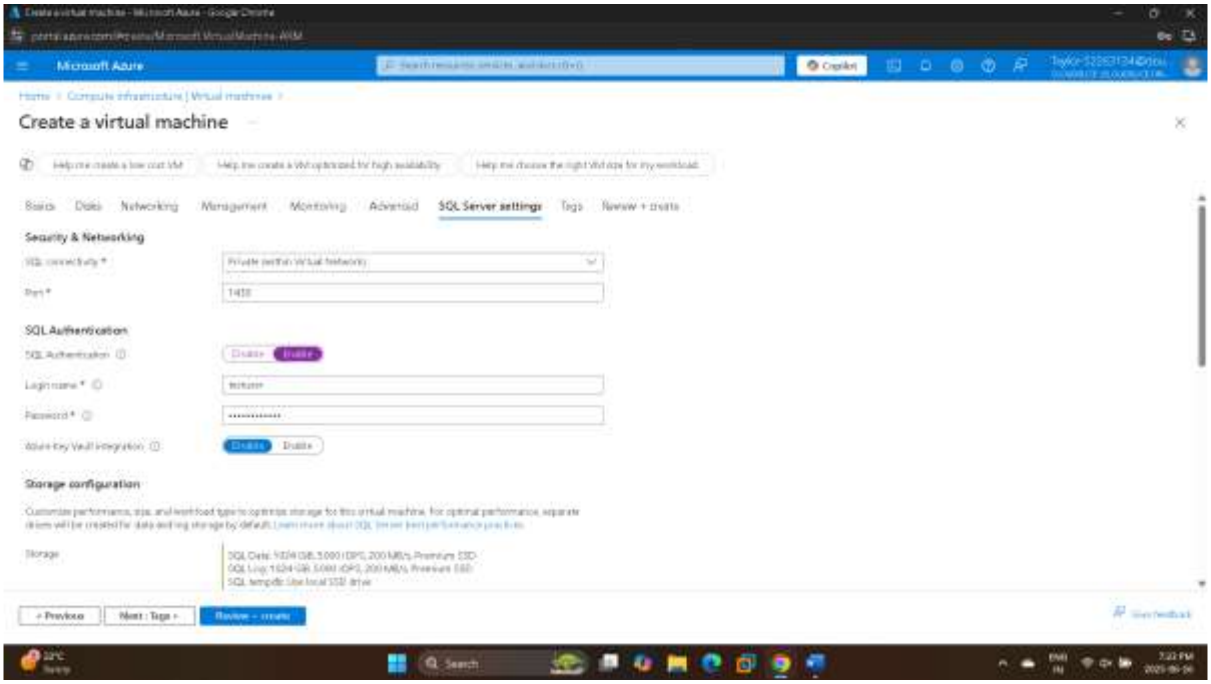
Health

Enable application health monitoring □

Microsoft Azure
Home > Compute infrastructure | Virtual machines >
Help me create a low cost VM
Help me create a VM optimized for high availability
Help me choose the right VM size for my workload
Basics
Disks
Networking
Management
Monitoring
Advanced
SQL Server settings
Tags
Review + create
< Previous
Next : Advanced >
Review + create

On the SQL Server settings page, in Security & Networking, ensure that SQL connectivity is set to **Private**, and that the Port is set to **1433**.

In SQL Authentication, in SQL Authentication, select **Enable**.



Create a virtual machine

SQL Server settings

Security & Networking

SQL connectivity *: Private (within Virtual Network)

Port *: 1433

SQL Authentication

SQL Authentication: Disable [✓ Enable]

Login name *: testuser

Password *: ••••••••••••••

Azure Key Vault integration: [✓ Enable] Disable

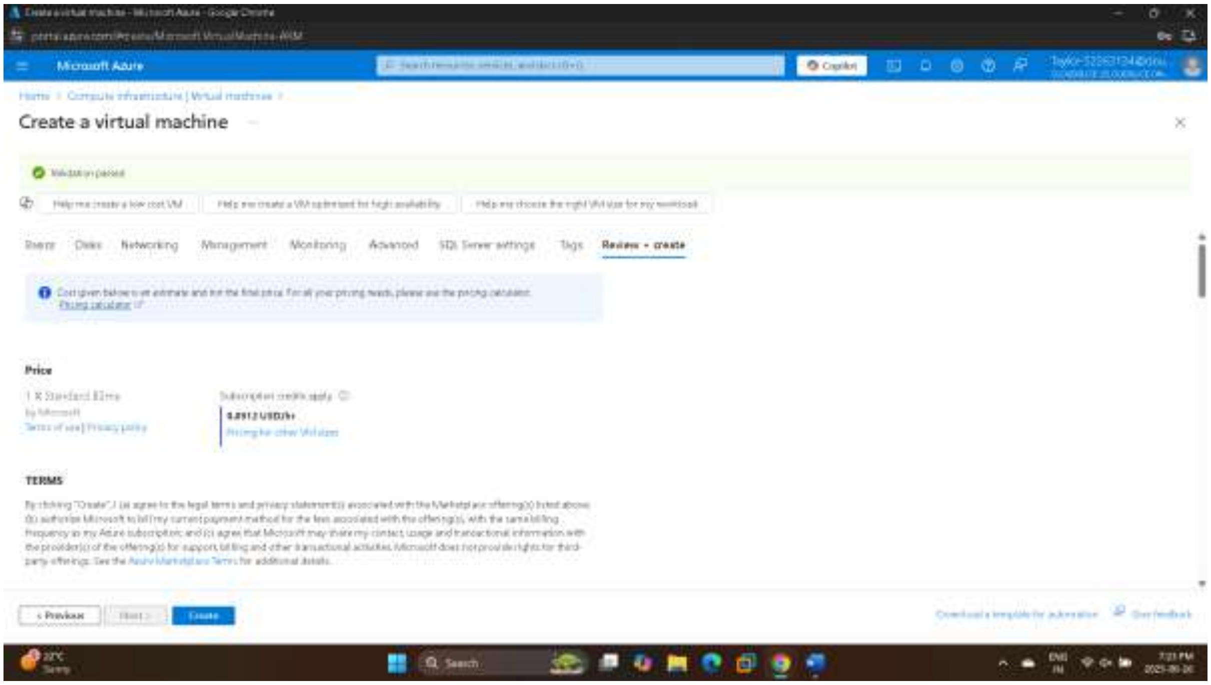
Storage configuration

Customize performance, size, and workload type to optimize storage for this virtual machine. For optimal performance, separate drives will be created for data and log storage by default. Learn more about SQL Server best performance practices

Storage: SQL Data: 1024 GiB, 5000 IOPS, 200 MB/s, Premium SSD
SQL Log: 1024 GiB, 5000 IOPS, 200 MB/s, Premium SSD
SQL tempdb: Use local SSD drive

Create a virtual machine - Microsoft Azure - Google Chrome
portal.azure.com/#create/Microsoft.VirtualMachine-ARM
Microsoft Azure
Copilot
Home > Compute infrastructure | Virtual machines >
Help me create a low cost VM
Help me create a VM optimized for high availability
Help me choose the right VM size for my workload
Basics
Disks
Networking
Management
Monitoring
Advanced
SQL Server settings
Tags
Review + create
< Previous
Next : Tags >
Review + create
Give feedback
Search

Select **Review + create**, and then select **Create**.



Create a virtual machine

Validation passed

Cost given below is an estimate and not the final price. For all your pricing needs, please use the pricing calculator.
Pricing calculator

Price

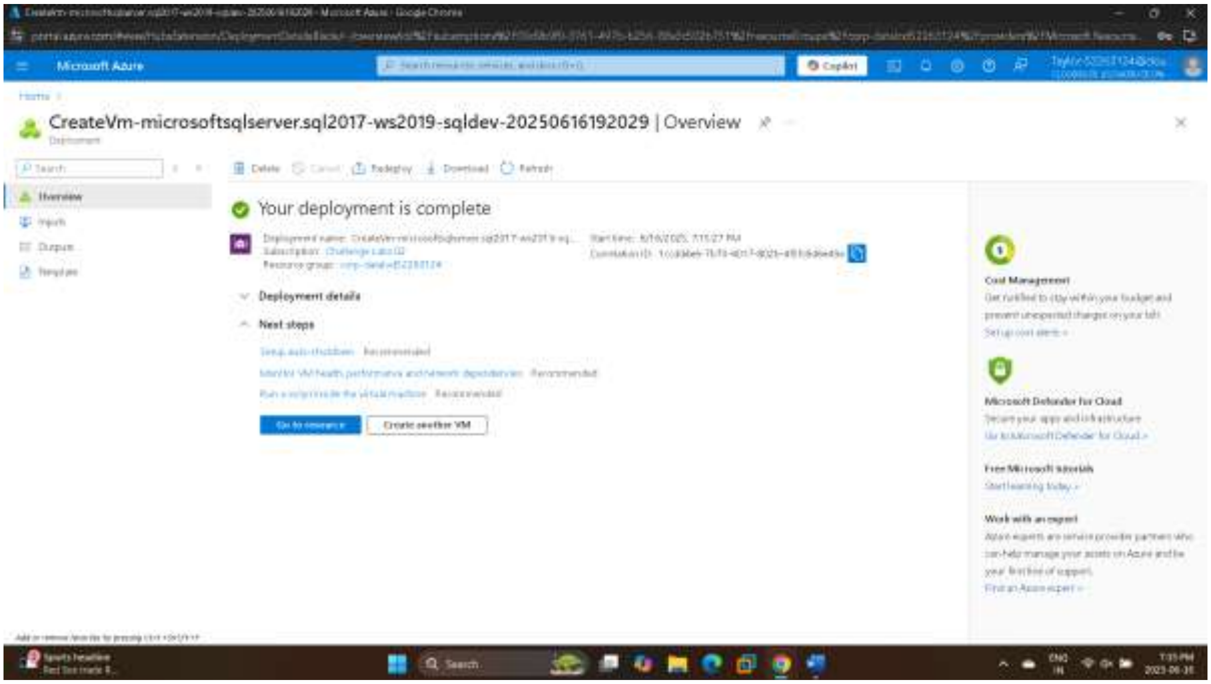
1 X Standard E2ms
by Microsoft
Terms of use | Privacy policy

Subscription credits apply
0.0912 USD/hr
Pricing for other VM sizes

TERMS

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the Azure Marketplace Terms for additional details.

Create a virtual machine - Microsoft Azure - Google Chrome
portal.azure.com/#create/Microsoft.VirtualMachine-ARM
Microsoft Azure
Copilot
Home > Compute infrastructure | Virtual machines >
Help me create a low cost VM
Help me create a VM optimized for high availability
Help me choose the right VM size for my workload
Basics
Disks
Networking
Management
Monitoring
Advanced
SQL Server settings
Tags
Review + create
< Previous
Next >
Create
Download a template for automation
Give feedback
Search



CreateVm-microsoftsqlserver.sql2017-ws2019-sqldev-20250616192029 | Overview

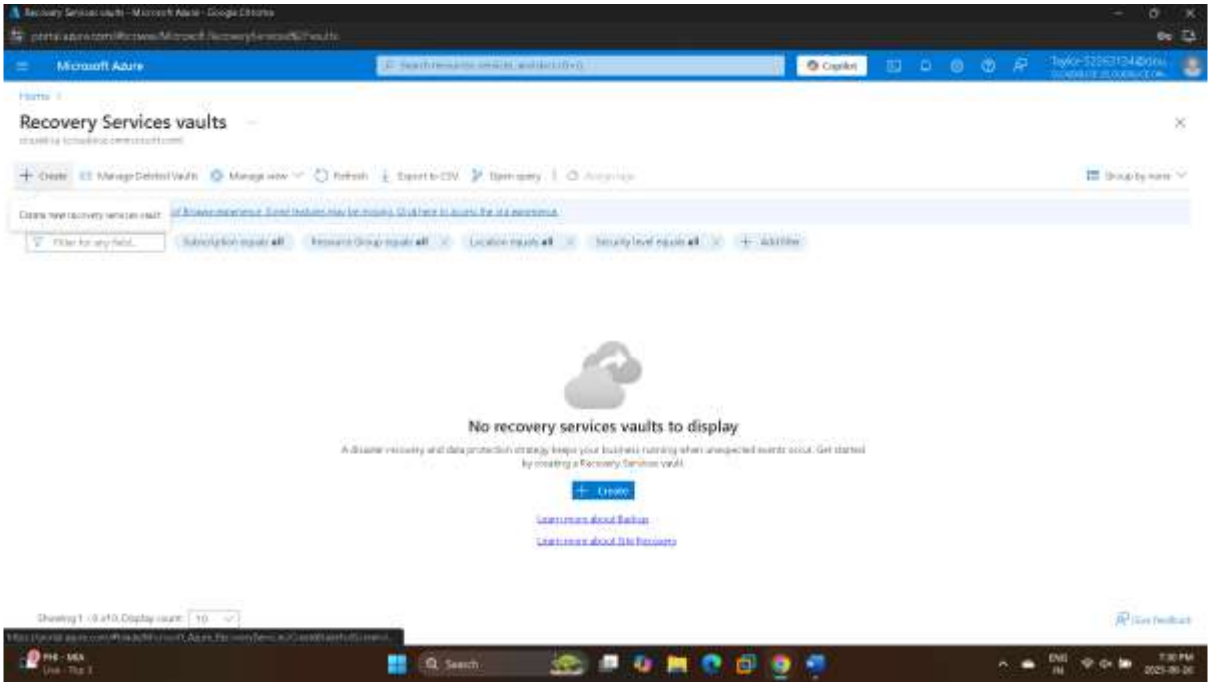
Your deployment is complete

Start time: 6/16/2025, 7:15:27 PM

Create a Recovery Services vault named vault52263124 in the **East US** region.

On the Microsoft Azure navigation bar at the top, search for and select Recovery Services vaults.

On the Recovery Services vaults blade, on the command bar, select **Create**.



Recovery Services vaults

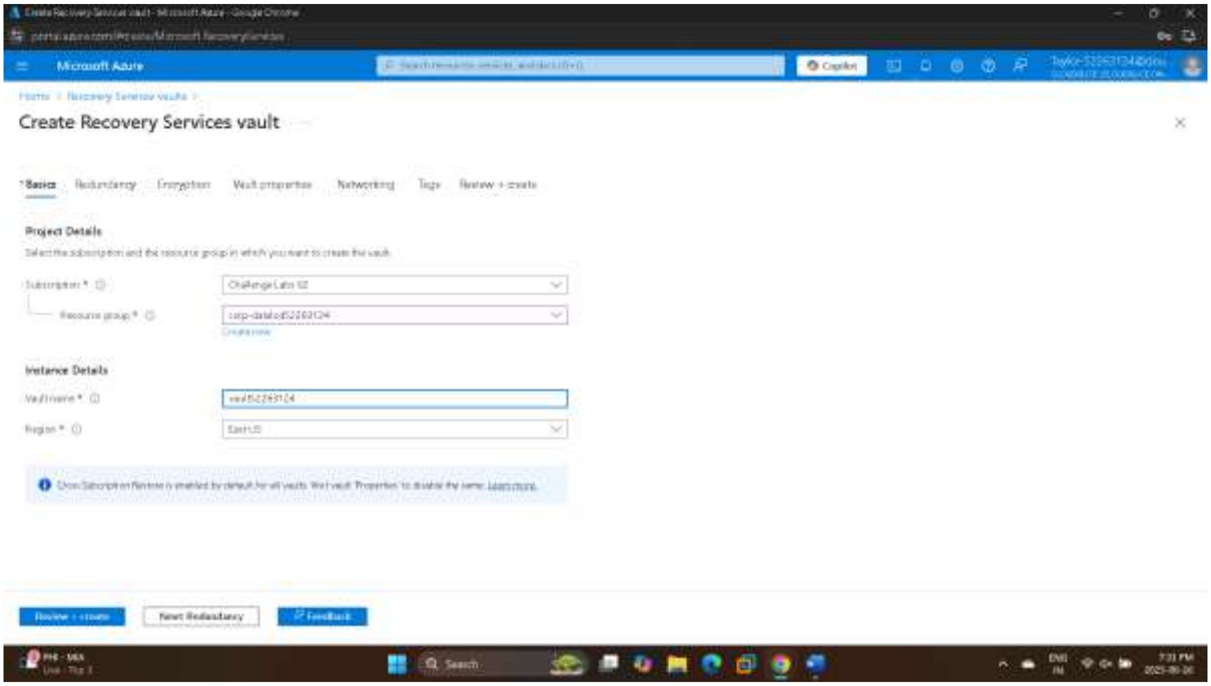
No recovery services vaults to display

A disaster recovery and data protection strategy keeps your business running when unexpected events occur. Get started by creating a Recovery Services vault.

On the Create Recovery Services vault blade, in Project Details, in resource group, select **corp-datalod52263124**

In Instance Details, in Vault name, enter vault52263124

In Region, ensure that **East US** is selected.



Create Recovery Services vault

Project Details

Select the subscription and the resource group in which you want to create the vault.

Subscription * : Challenge Labs 02

Resource group * : corp-datalod52269124

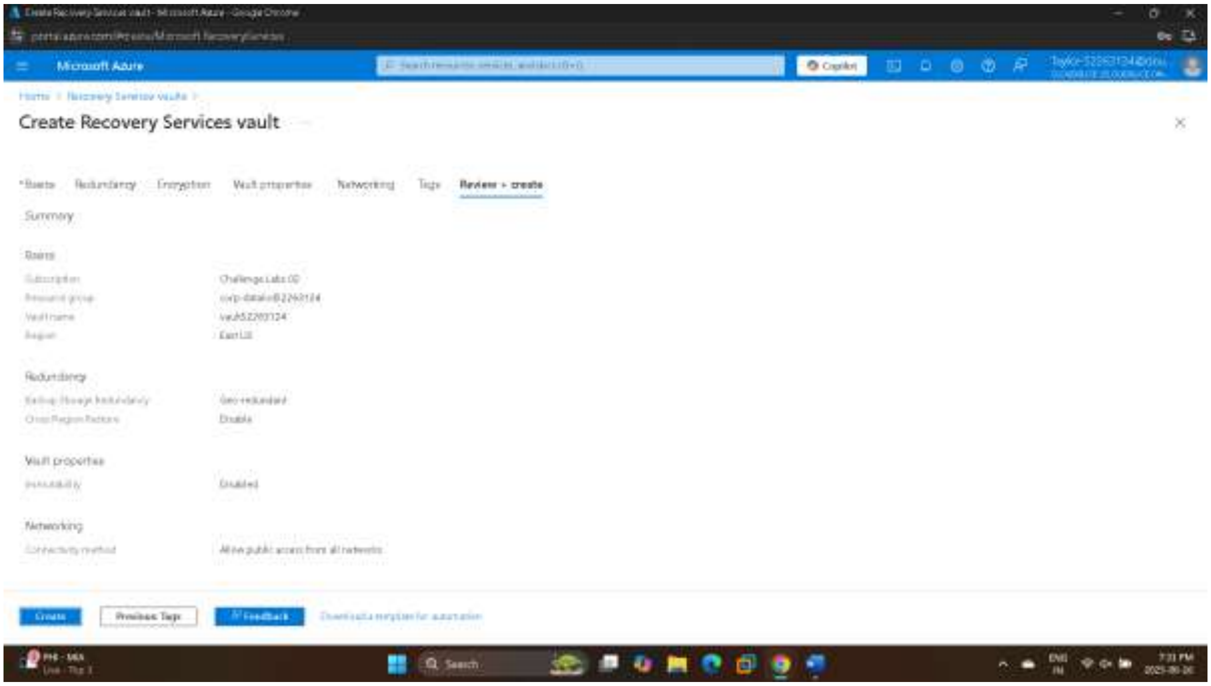
Instance Details

Vault name * : vault52269124

Region * : East US

Cross Subscription Restore is enabled by default for all vaults. Visit vault 'Properties' to disable the same. Learn more.

Select **Review + create**, and then select **Create**.



Create Recovery Services vault

Summary

Basics

Subscription	Challenge Labs 02
Resource group	corp-datalod52269124
Vault name	vault52269124
Region	East US

Redundancy

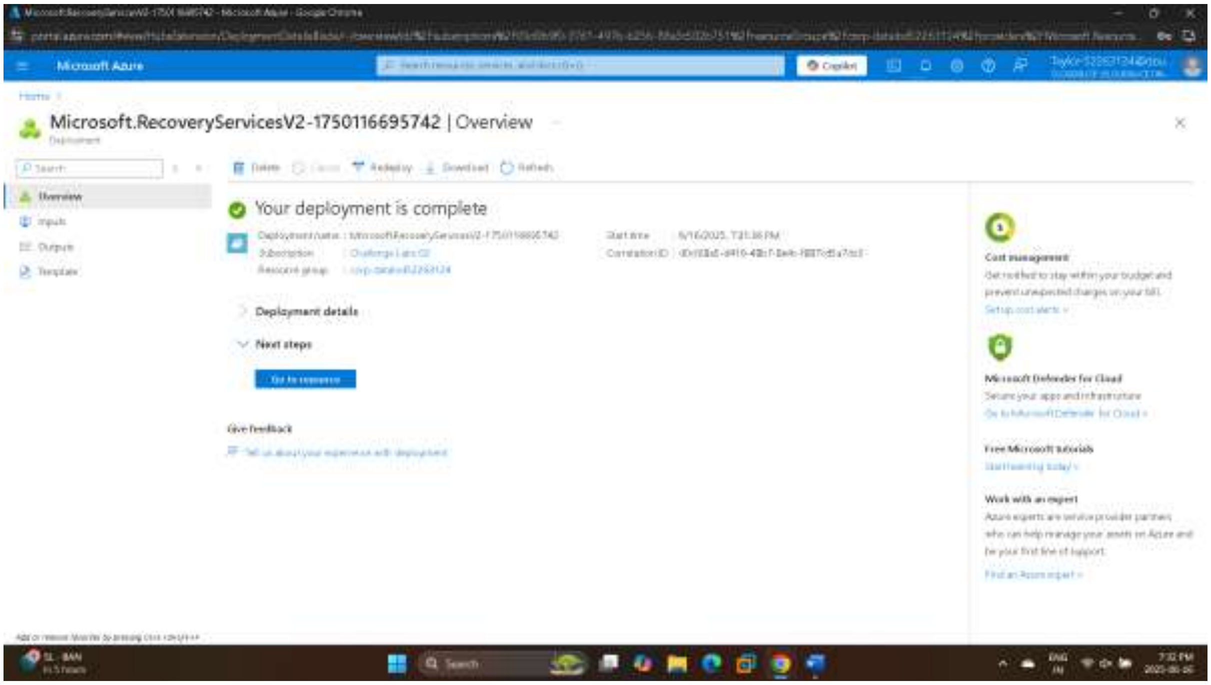
Backup Storage Redundancy	Geo-redundant
Cross Region Restore	Disable

Vault properties

Immutability	Disabled

Networking

Connectivity method	Allow public access from all networks



Microsoft.RecoveryServicesV2-1750116695742 | Overview

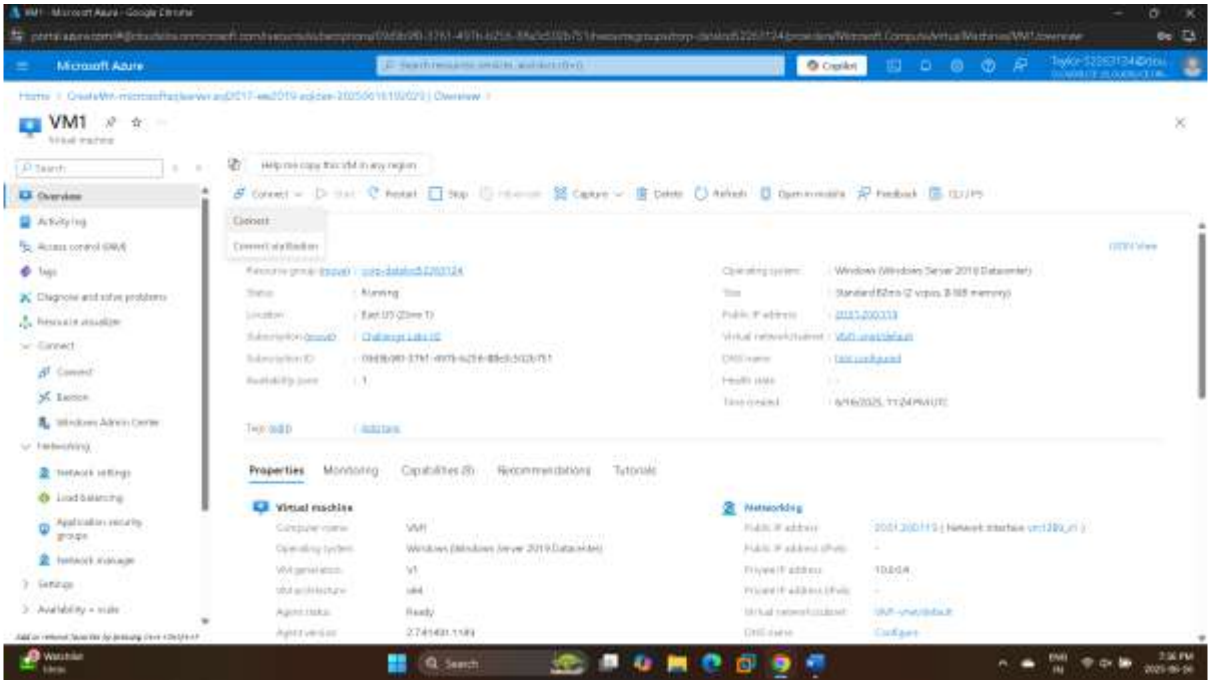
Your deployment is complete

Start time : 6/16/2025, 7:21:38 PM

Connect to **VM1** via **RDP**, by using the testuser account, and Pa55w.rd1234 as the password, to open a Remote Desktop Connection.

On the Azure portal menu, select **Virtual machines**, and then select **VM1**.

On the VM1 service menu, in Connect, select **Connect**.



VM1

Status : Running

Availability zone : 1

Operating system : Windows (Windows Server 2019 Datacenter)

Time created : 6/16/2025, 11:24 PM UTC

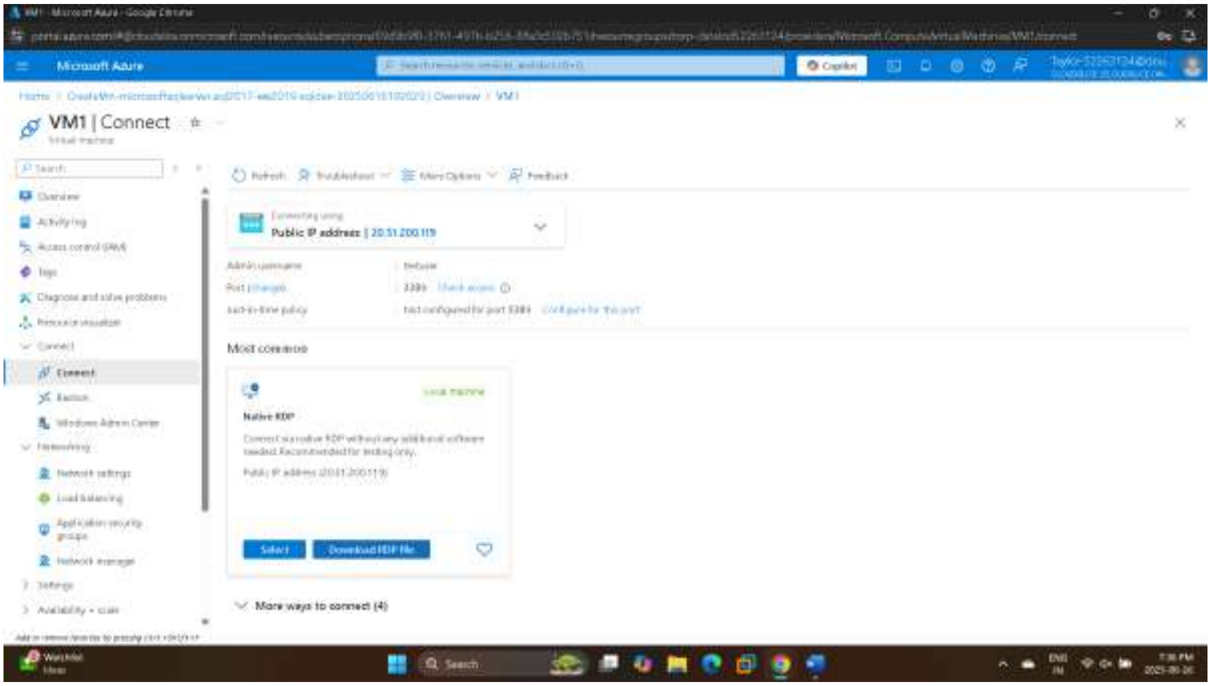
Computer name : VM1

Operating system : Windows (Windows Server 2019 Datacenter)

VM generation : V1

Agent status : Ready

On the Native RDP tile, select **Download RDP file**.



VM1 | Connect

Connecting using
Public IP address | 20.51.200.119

Admin username: testuser
Port (change): 3389
Just-in-time policy: Not configured for port 3389

Most common

Native RDP

Connect via native RDP without any additional software needed. Recommended for testing only.

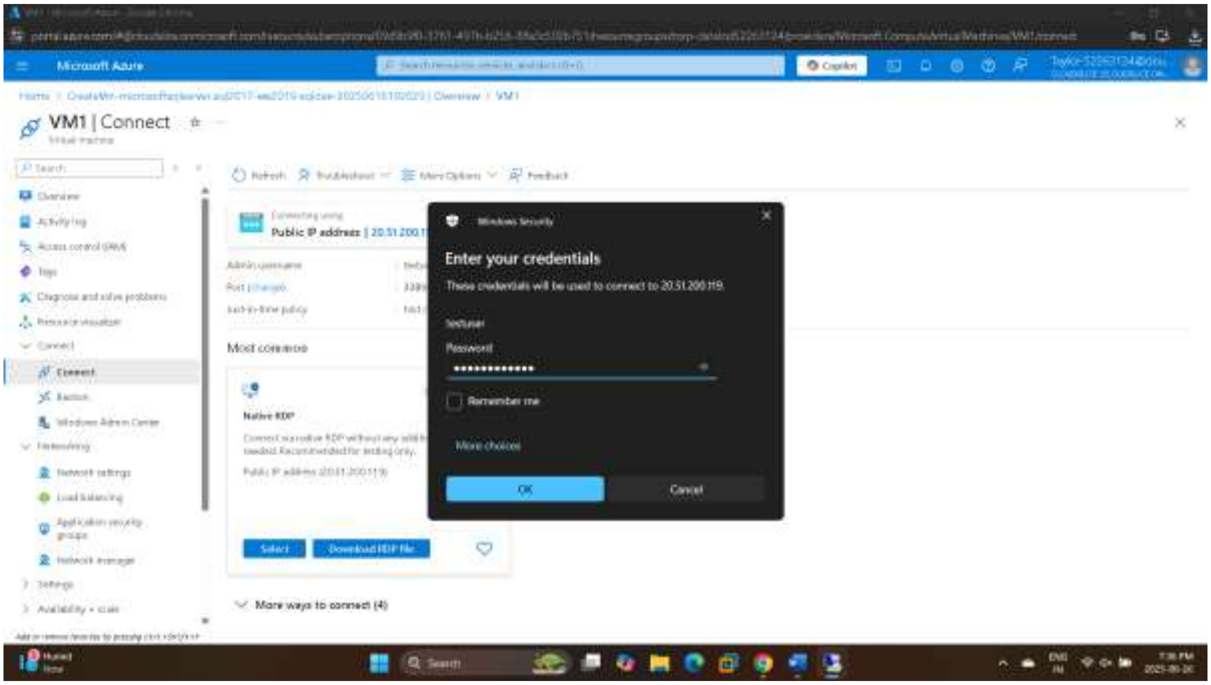
Public IP address (20.51.200.119)

If the In the Downloads prompt is displayed, select **Keep**.

Open the downloaded file, and in the Remote Desktop Connection dialog, select **Connect**.

In Windows Security, in Enter your credentials, ensure that username is displayed as **testuser**, and then in Password, enter Pa55w.rd1234, and then select **OK**.

Select **Yes** to connect.



Windows Security

Enter your credentials

These credentials will be used to connect to 20.51.200.119.

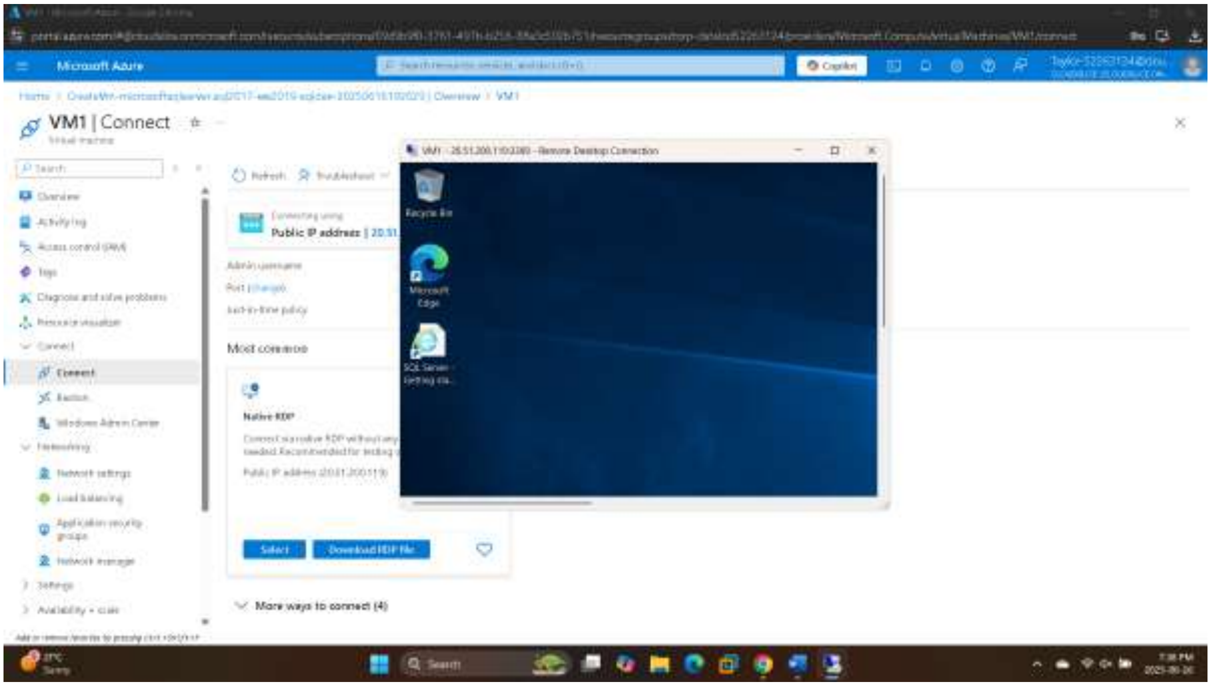
testuser

Password: •••••••••••••

□ Remember me

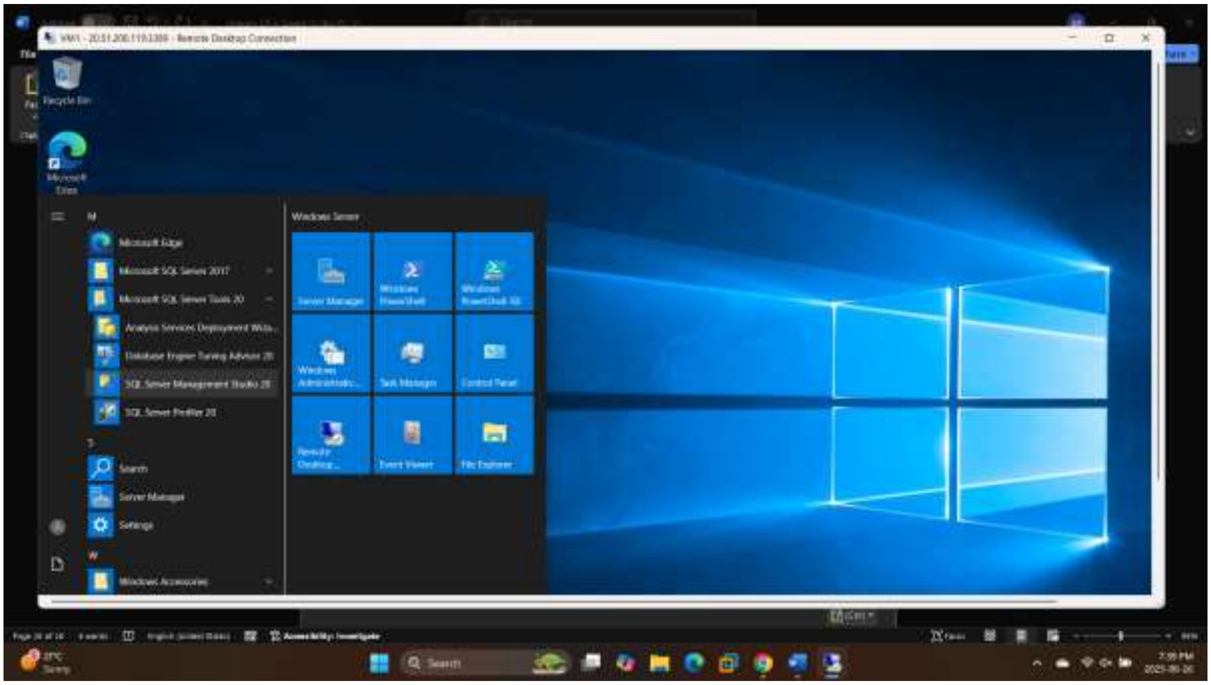
In the Remote Desktop Connection, if prompted *Do you want to allow your PC to be discoverable by other PCs amd devices on this network?*, select **No**.

When Server Manager opens, minimize **Server Manager**.



Start **SQL Server Management Studio** (SSMS), connect to the **VM1** Server by using **Windows Authentication** and the **Trust server certificate** option, and then create a database named MyDB.

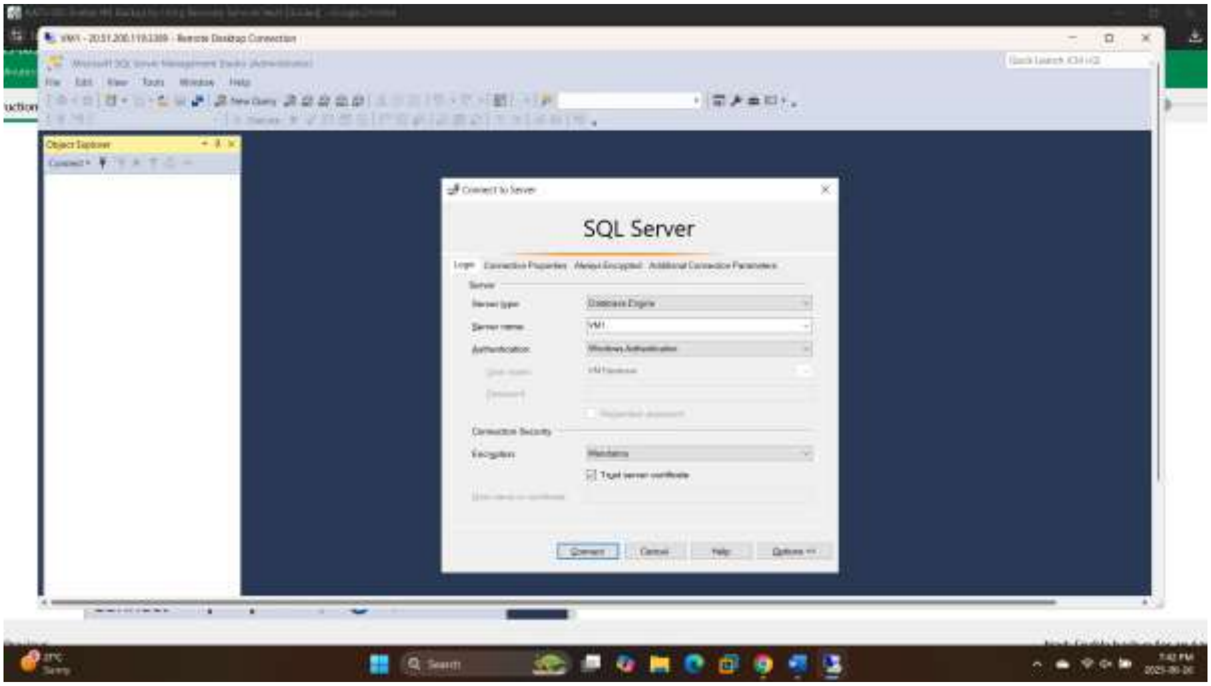
In the Remote Desktop Connection, select the Windows **Start** button, expand **Microsoft SQL Server Tools 20**, and then select **SQL Server Management Studio 20**.



In the Connect to Server dialog, in Server name, ensure **VM1** is selected.

In Authentication, ensure that **Windows Authentication** is selected.

In Connection Security, select the **Trust server certificate** check box, and then select **Connect**.



Server type: Database Engine

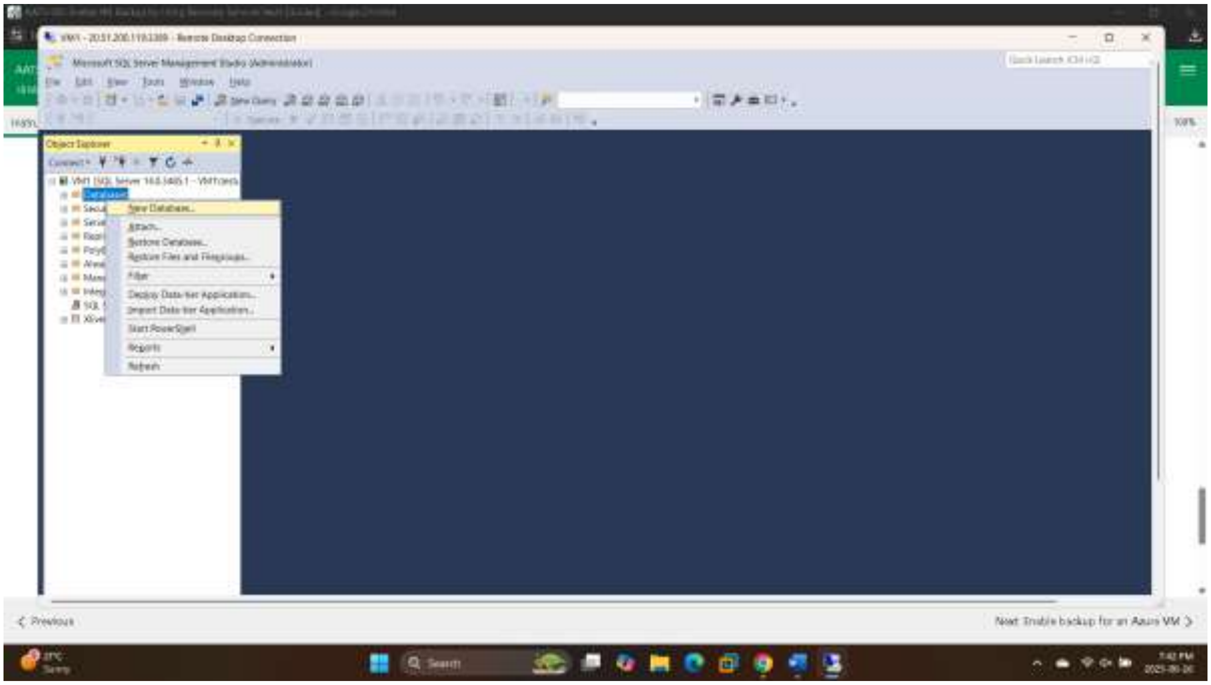
Server name: VM1

Authentication: Windows Authentication

Encryption: Mandatory

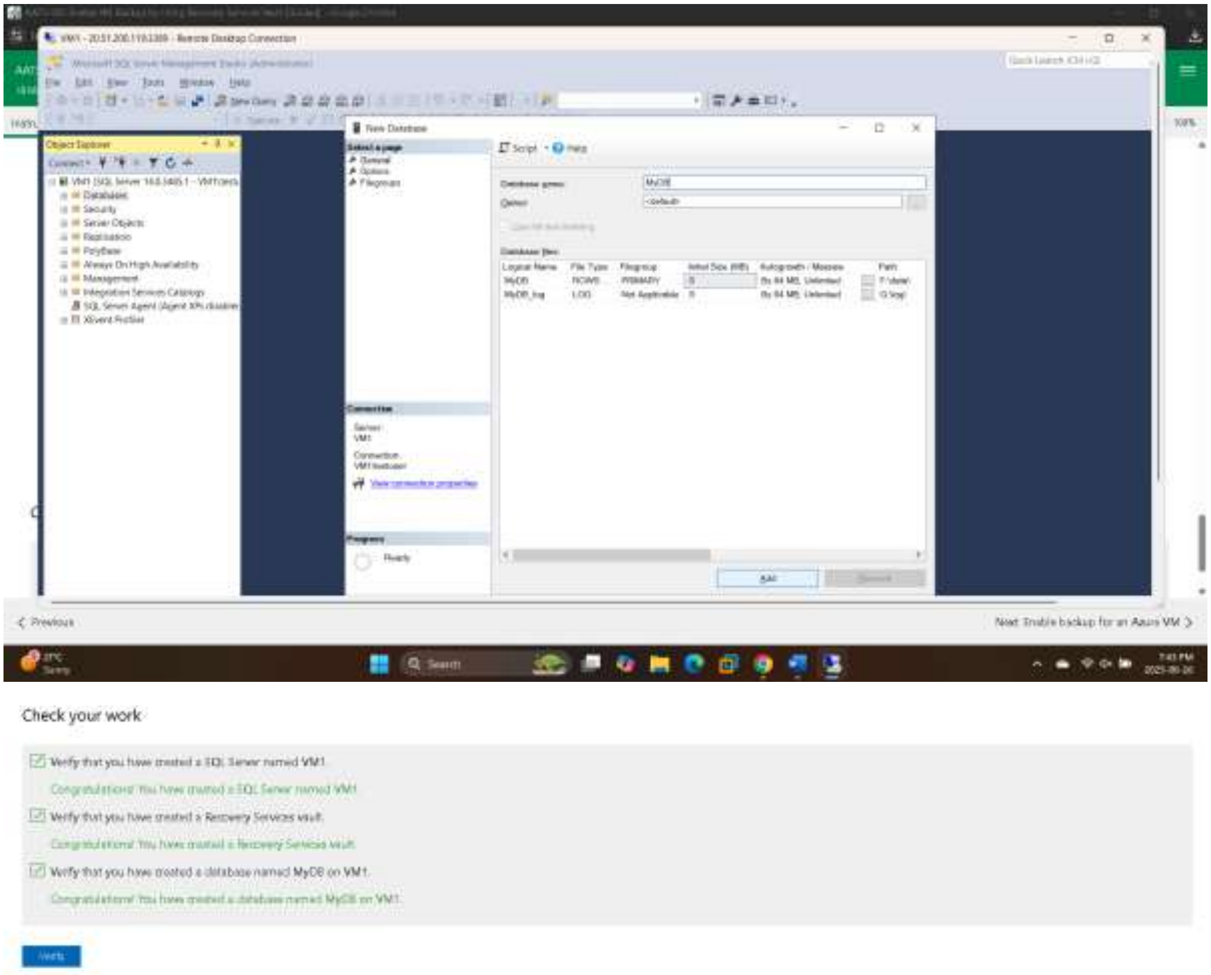
☑ Trust server certificate

In the Object Explorer pane, right-click **Databases**, and then select **New Database**.



Object Explorer
Databases
New Database...
Attach...
Restore Database...
Restore Files and Filegroups...
Filter
Deploy Data-tier Application...
Import Data-tier Application...
Start PowerShell
Reports
Refresh
Previous
Next: Enable backup for an Azure VM

In the New Database dialog, in Database name, enter MyDB, and then select **OK**.



Database name: MyDB

Owner: <default>

Database files:

Logical Name	File Type	Filegroup	Initial Size (MB)	Autogrowth / Maxsize	Path
MyDB	ROWS ...	PRIMARY	8	By 64 MB, Unlimited	F:\data\
MyDB_log	LOG	Not Applicable	8	By 64 MB, Unlimited	G:\log\

Check your work

☑ Verify that you have created a SQL Server named VM1.

Congratulations! You have created a SQL Server named VM1.

☑ Verify that you have created a Recovery Services vault.

Congratulations! You have created a Recovery Services vault.

☑ Verify that you have created a database named MyDB on VM1.

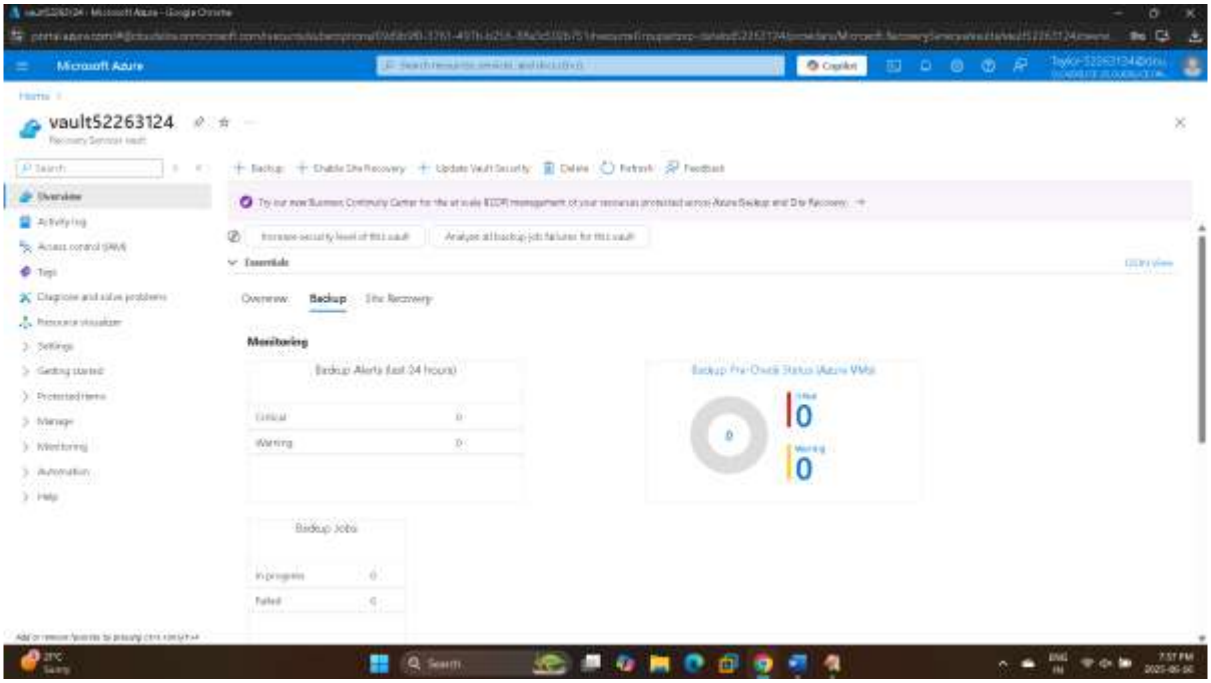
Congratulations! You have created a database named MyDB on VM1.

- Enable backup for an Azure VM

Configure vault52263124 to enable the Backup of the VM1 in the corp-datalod52263124 resource group by using a new Standard backup policy named policy52263124 that backs up the VM Daily at 1 AM Eastern Time (US & Canada) and uses the default retention policies.

On the Azure portal menu, select All resources, and then select vault52263124.

On the vault52263124 blade, on the command bar, select + Backup.



vault52263124

Recovery Services vault

Backup | Site Recovery

Monitoring

Backup Alerts (last 24 hours)

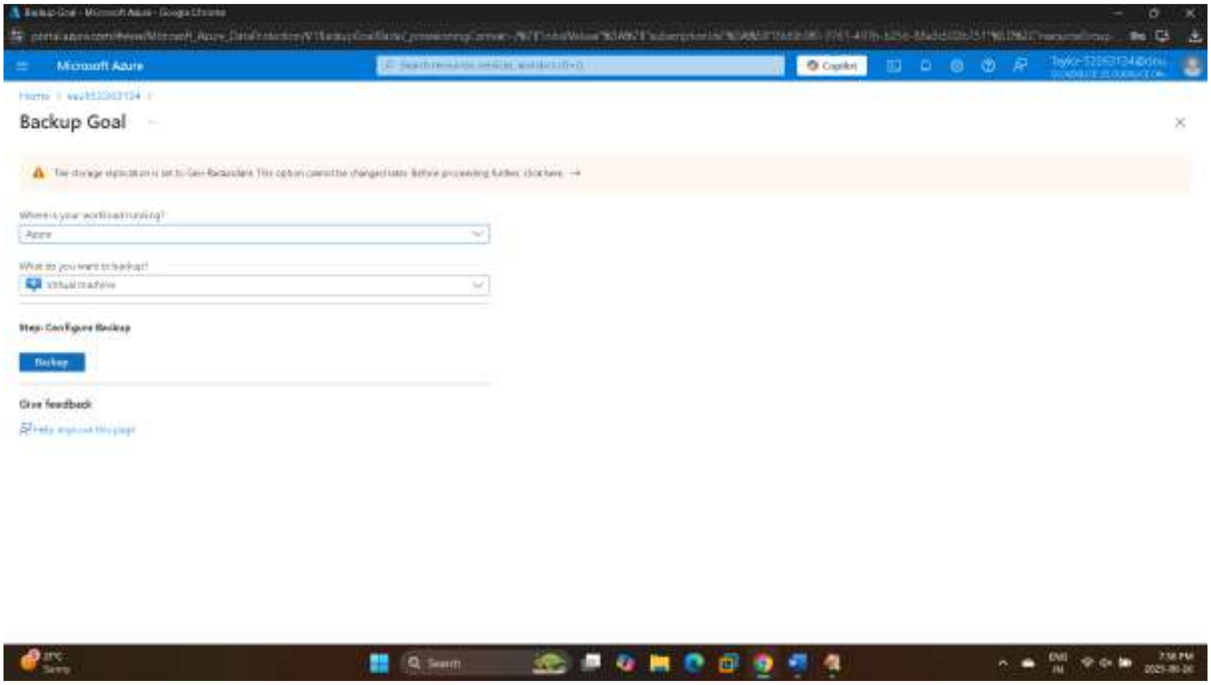
Critical	0
Warning	0

Backup Pre-Check Status (Azure VMs)

Backup Jobs

In progress	0
Failed	0

On the Backup Goal blade, in Where is your workload running?, ensure that Azure is selected.



Backup Goal

Where is your workload running?: Azure

What do you want to backup?: Virtual machine

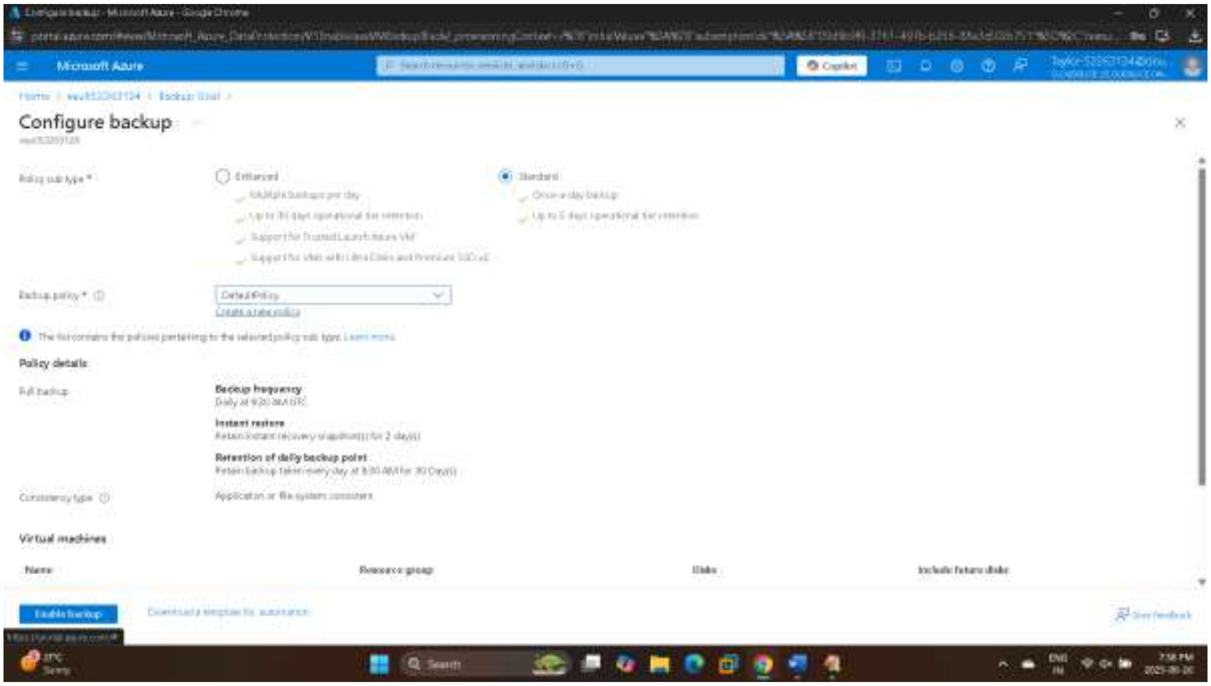
Step: Configure Backup

Backup

Give feedback

In What do you want to backup?, ensure that Virtual Machine is selected, and then select Backup.

On the Configure backup blade, in Policy sub type, select Standard.



Configure backup

Policy sub type *

○ Enhanced
- Multiple backups per day
- Up to 30 days operational tier retention
- Support for Trusted Launch Azure VM
- Support for VMs with Ultra Disks and Premium SSD v2

● Standard
- Once a day backup
- Up to 5 days operational tier retention

Backup policy * DefaultPolicy

Create a new policy

The list contains the policies pertaining to the selected policy sub type. Learn more

Policy details

Full backup

Backup frequency
Daily at 9:30 AM UTC

Instant restore
Retain instant recovery snapshot(s) for 2 day(s)

Retention of daily backup point
Retain backup taken every day at 9:30 AM for 30 Day(s)

Consistency type: Application or file-system consistent

Virtual machines

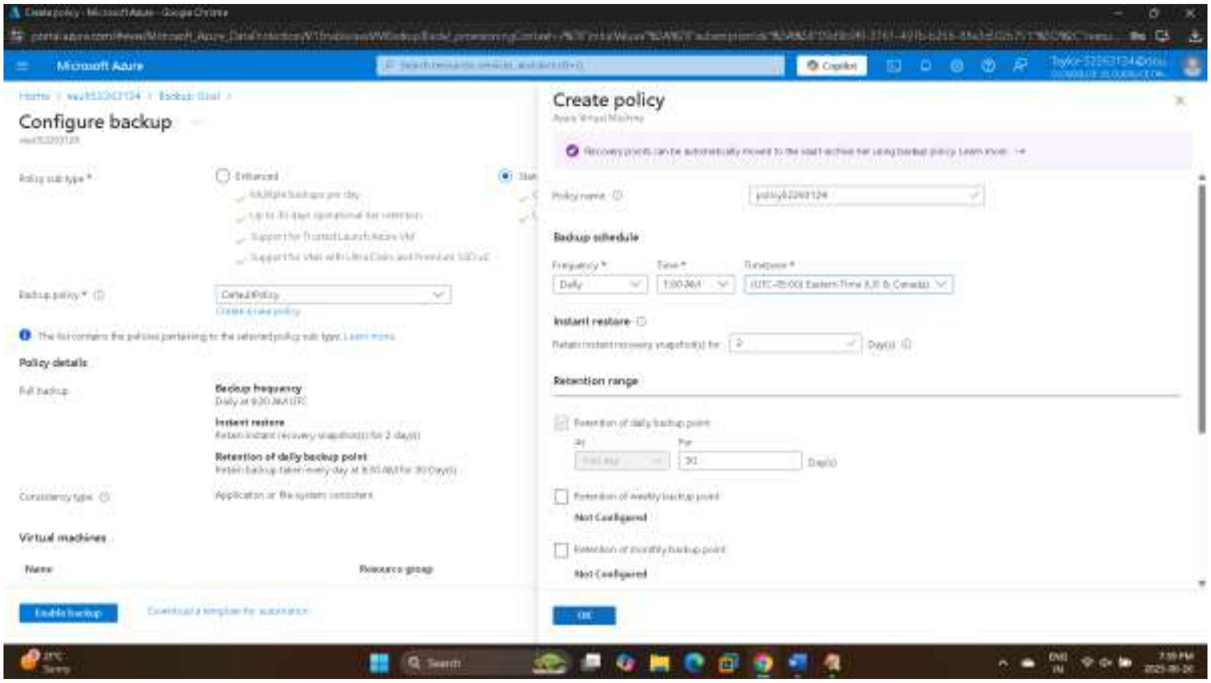
Name	Resource group	Disks	Include future disks

In Backup policy, select Create a new policy.

On the Create policy blade, in Policy name, enter policy52263124.

In Backup schedule, in Frequency, ensure that Daily is selected, and then in Time, select 1:00AM.

In Timezone, select (UTC-05:00) Eastern Time (US & Canada), and then select OK.



Create policy

Azure Virtual Machine

Recovery points can be automatically moved to the vault-archive tier using backup policy. Learn more →

Policy name: policy52263124

Backup schedule

Frequency *: Daily
Time *: 1:00 AM
Timezone *: (UTC-05:00) Eastern Time (US & Canada)

Instant restore

Retain instant recovery snapshot(s) for: 2 Day(s)

Retention range

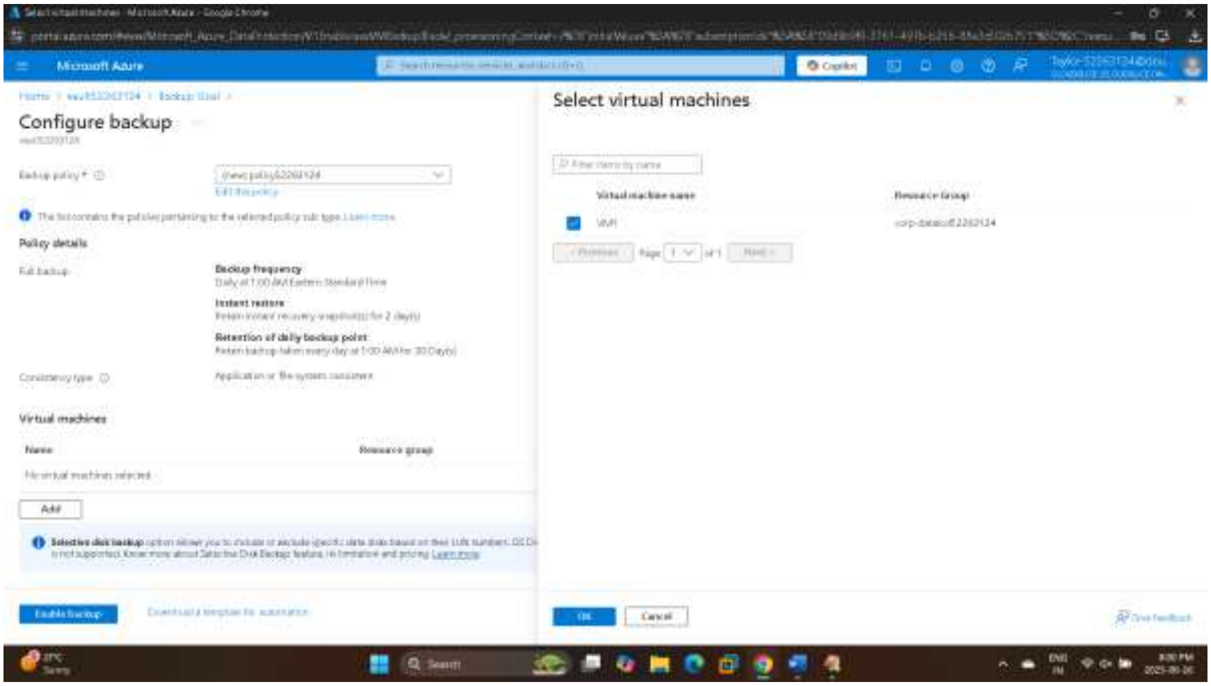
☑ Retention of daily backup point
At: 1:00 AM For: 30 Day(s)

☐ Retention of weekly backup point
Not Configured

☐ Retention of monthly backup point
Not Configured

On the Configure backup blade, scroll down, and then in Virtual machines, select Add.

On the Select virtual machines blade, select the VM1 check box, and then select OK.



Configure backup

Backup policy * (new) policy52263124
Edit this policy

The list contains the policies pertaining to the selected policy sub type. Learn more

Policy details

Full backup

Backup frequency
Daily at 1:00 AM Eastern Standard Time

Instant restore
Retain instant recovery snapshot(s) for 2 day(s)

Retention of daily backup point
Retain backup taken every day at 1:00 AM for 30 Day(s)

Consistency type: Application or file system consistent

Virtual machines

Name	Resource group
No virtual machines selected	

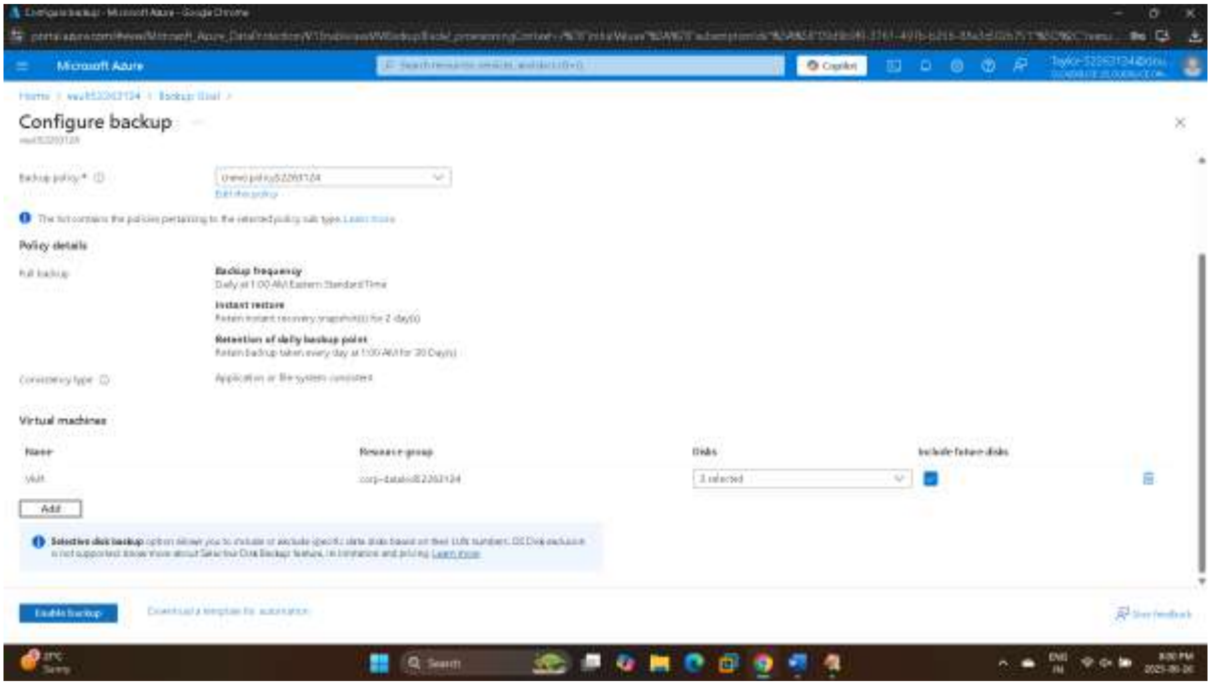
Selective disk backup option allows you to include or exclude specific data disks based on their LUN numbers. OS Di... is not supported. Know more about Selective Disk Backup feature, its limitation and pricing. Learn more

Select virtual machines

	Virtual machine name	Resource Group
☑	VM1	corp-datalod52263124

Page 1 of 1

On the Configure backup blade, select Enable backup.



Configure backup

Backup policy * (new) policy52263124
Edit this policy

The list contains the policies pertaining to the selected policy sub type. Learn more

Policy details

Full backup

Backup frequency
Daily at 1:00 AM Eastern Standard Time

Instant restore
Retain instant recovery snapshot(s) for 2 day(s)

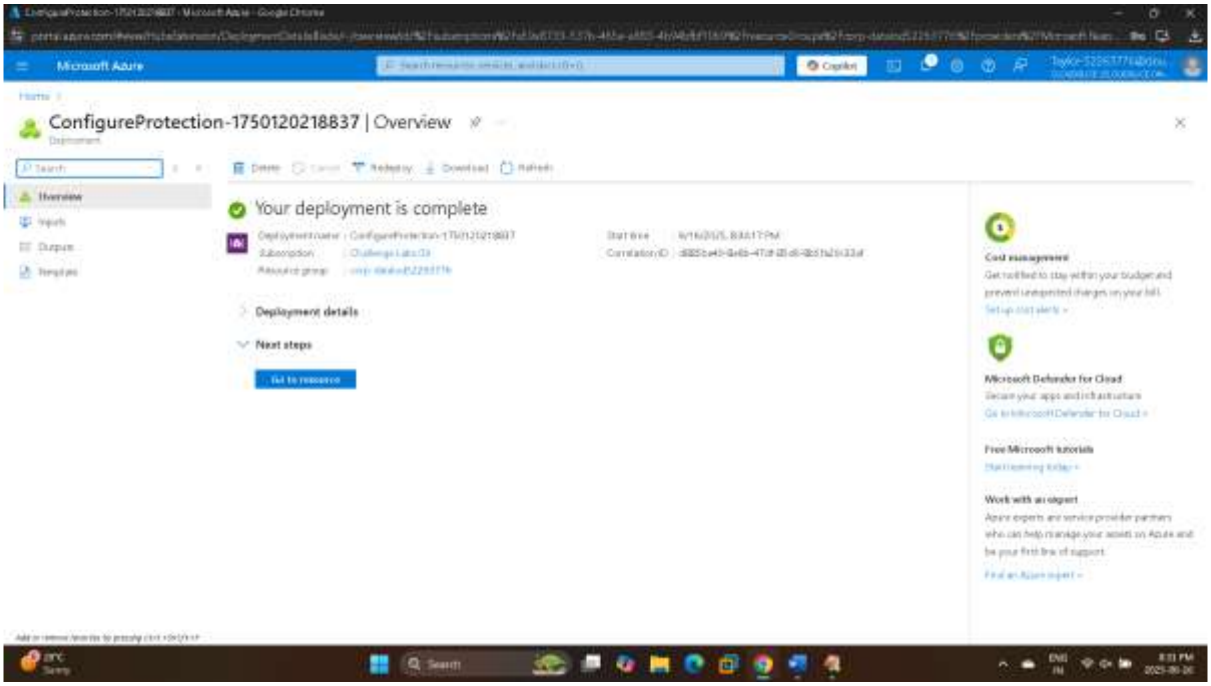
Retention of daily backup point
Retain backup taken every day at 1:00 AM for 30 Day(s)

Consistency type: Application or file system consistent

Virtual machines

Name	Resource group	Disks	Include future disks
VM1	corp-datalod52263124	3 selected	☑

Selective disk backup option allows you to include or exclude specific data disks based on their LUN numbers. OS Disk exclusion is not supported. Know more about Selective Disk Backup feature, its limitation and pricing. Learn more



ConfigureProtection-1750120218837 | Overview

Deployment

Your deployment is complete

Deployment name : ConfigureProtection-1750120218837

Subscription : Challenge Labs 03

Resource group : corp-datalod52263124

Start time : 6/16/2025, 8:30:17 PM

Correlation ID : [illegible]

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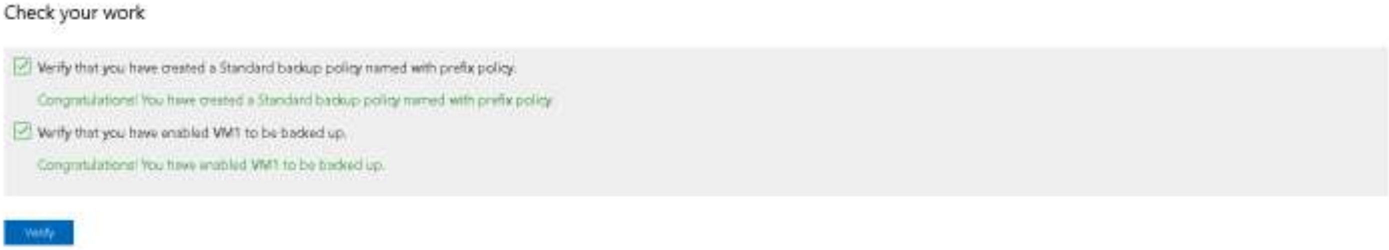


Check your work

☑ Verify that you have created a Standard backup policy named with prefix policy.

Congratulations! You have created a Standard backup policy named with prefix policy.

☑ Verify that you have enabled VM1 to be backed up.

Congratulations! You have enabled VM1 to be backed up.

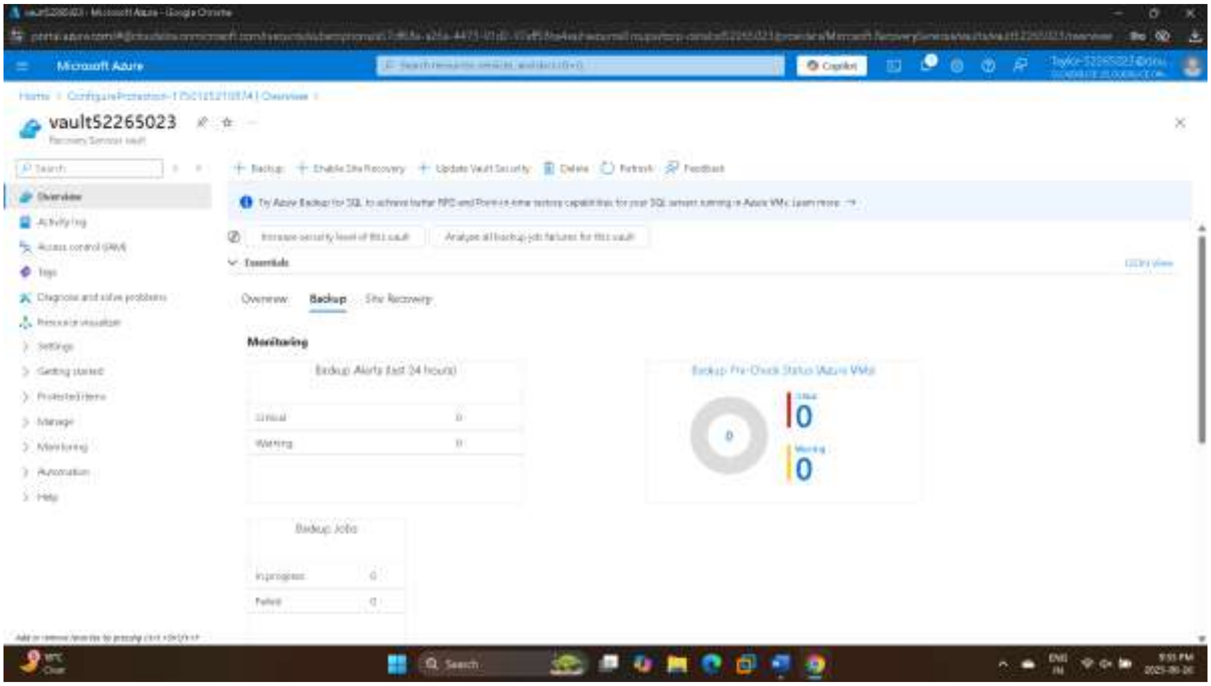
Verify

- Enable SQL Server Backup in Azure VM

Configure vault52263124 to backup MyDB SQL Server database on the VM1 virtual machine in the corp-datalod52263124 resource group by using the Start Discovery and Configure Backup options.

On the Azure portal menu, select All resources, and then select vault52263124.

On the vault52263124 blade, on the command bar, select + Backup.



vault52265023

Recovery Services vault

Try Azure Backup for SQL to achieve better RPO and Point-in-time restore capabilities for your SQL servers running in Azure VMs. Learn more →

Monitoring

Backup Alerts (last 24 hours)

Critical	0
Warning	0

Backup Pre-Check Status (Azure VMs)

Critical 0

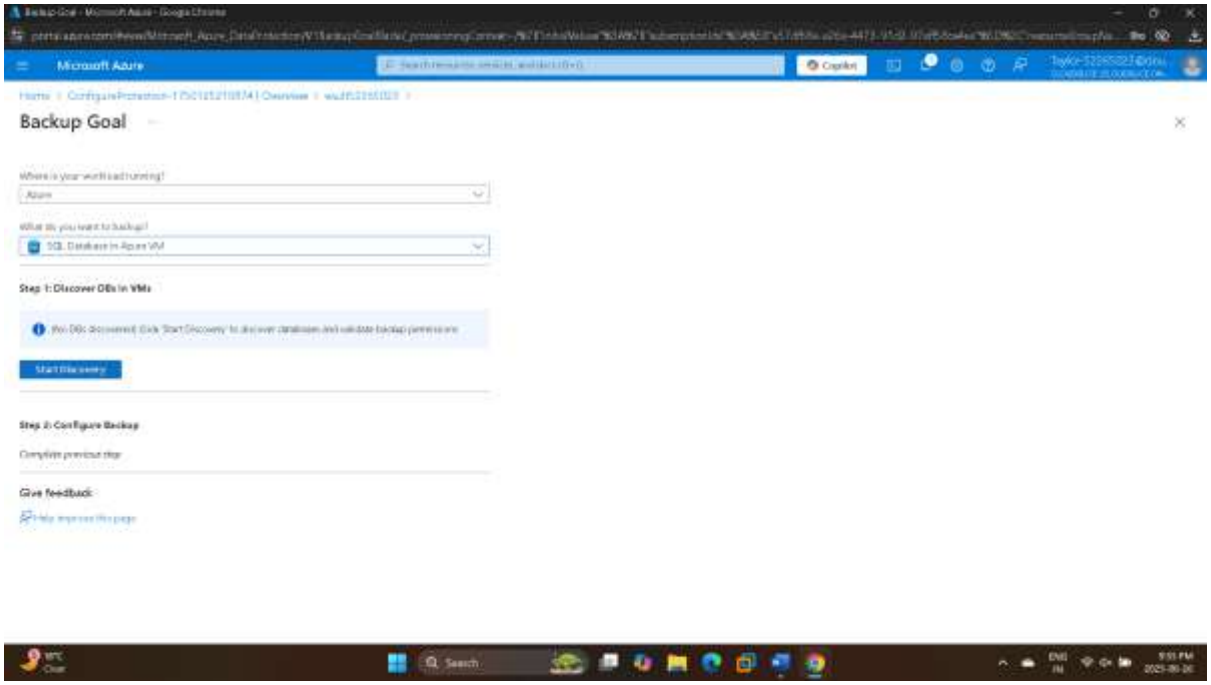
Warning 0

Backup Jobs

In progress	0
Failed	0

On the Backup Goal blade, in Where is your workload running? ensure that Azure is selected.

In What do you want to back up?, select SQL Database in Azure VM, and then in Step 1: Discover DBs in VMs, select Start Discovery.


Microsoft Azure
Home > ConfigureProtection-1750125210574 | Overview > vault52265023 >
Start Discovery
Give feedback
Help improve this page

Backup Goal

Where is your workload running?: Azure

What do you want to backup?: SQL Database in Azure VM

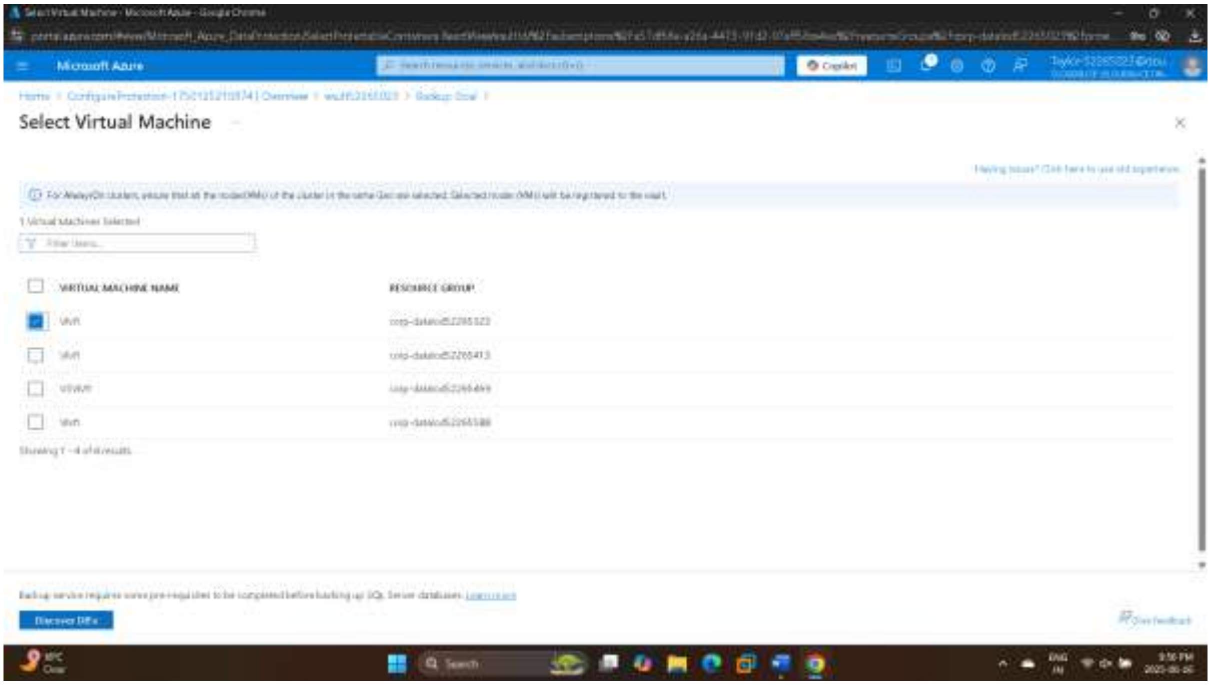
Step 1: Discover DBs in VMs

No DBs discovered. Click 'Start Discovery' to discover databases and validate backup permissions.

Step 2: Configure Backup

Complete previous step

If necessary, on the Select Virtual Machine pane, select the VM1 check box in the corp-datalod52263124 resource group, and then select Discover DB's.



Select Virtual Machine

For AlwaysOn clusters, ensure that all the nodes(VMs) of the cluster in the same Geo are selected. Selected nodes (VMs) will be registered to the vault.

1 Virtual Machines Selected

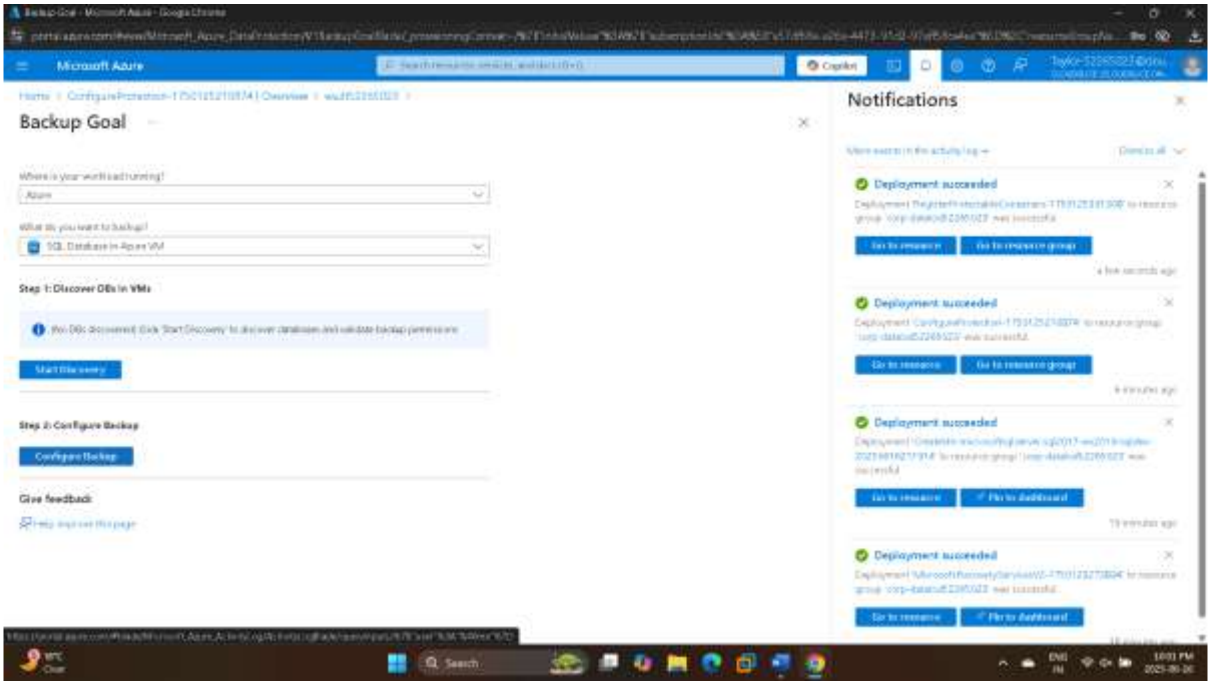
	VIRTUAL MACHINE NAME	RESOURCE GROUP
☑	VM1	corp-datalod52265323
□	VM1	corp-datalod52265413
□	VSVM1	corp-datalod52265499
□	VM1	corp-datalod52265588

Showing 1 - 4 of 4 results.

Backup service requires some pre-requisites to be completed before backing up SQL Server databases. Learn more

In Step 2: Configure Backup, select Configure Backup.

In SQL Databases, select Add.



Backup Goal

Where is your workload running?
Azure

What do you want to backup?
SQL Database in Azure VM

Step 1: Discover DBs in VMs

No DBs discovered. Click 'Start Discovery' to discover databases and validate backup permissions.

Step 2: Configure Backup

Notifications

Deployment succeeded

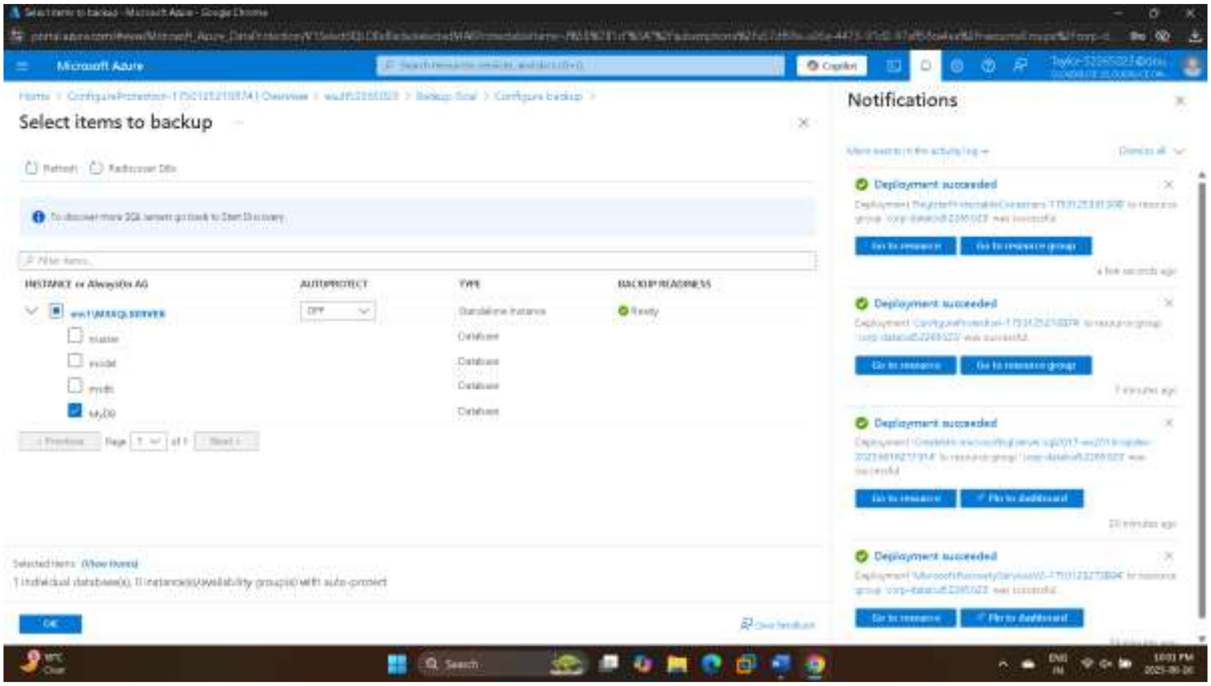
Deployment succeeded

Deployment succeeded

Deployment succeeded

On the Select items to backup blade, expand vm1\MSSQLSERVER.

Select the check box for MyDB, and then select OK.

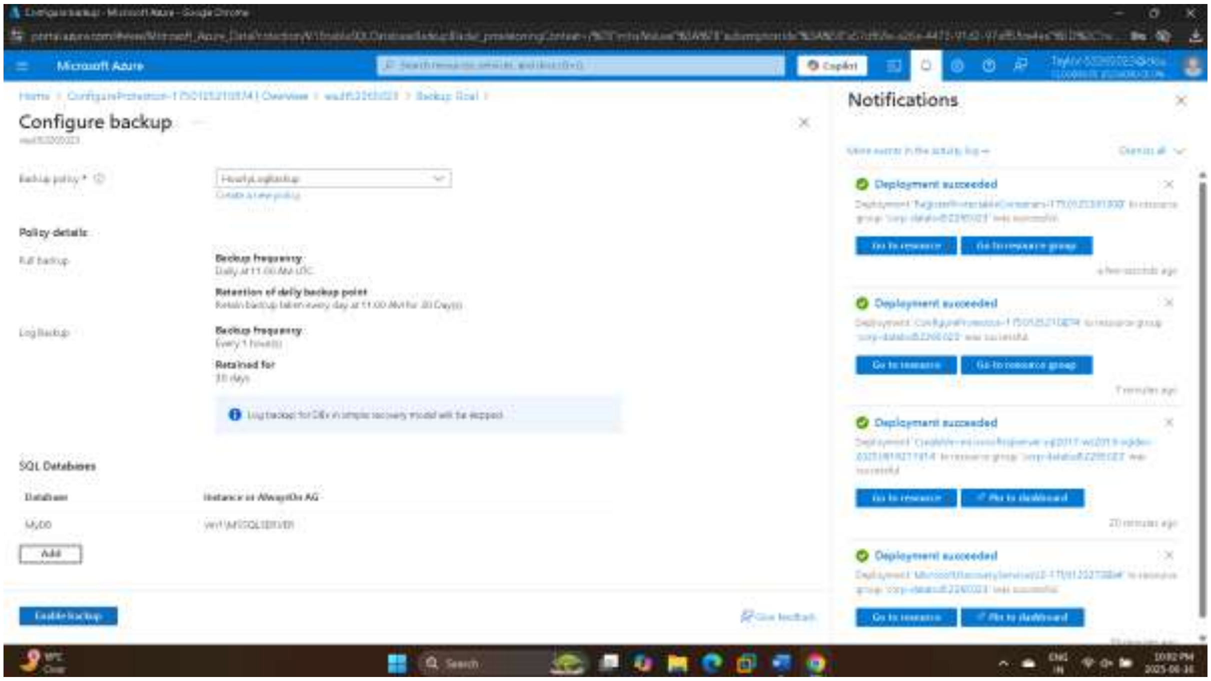


Select items to backup

INSTANCE or AlwaysOn AG	AUTOPROTECT	TYPE	BACKUP READINESS
■ win1\MSSQLSERVER	OFF	Standalone instance	Ready
□ master		Database	
□ model		Database	
□ msdb		Database	
☑ MyDB		Database	

Selected items (Show items)
1 individual database(s), 0 instance(s)/availability group(s) with auto-protect

On the Configure backup blade, select Enable backup.



Configure backup

Backup policy * HourlyLogBackup

Policy details

Full backup
Backup frequency
Daily at 11:00 AM UTC
Retention of daily backup point
Retain backup taken every day at 11:00 AM for 30 Day(s)

Log Backup
Backup frequency
Every 1 hour(s)
Retained for
30 days

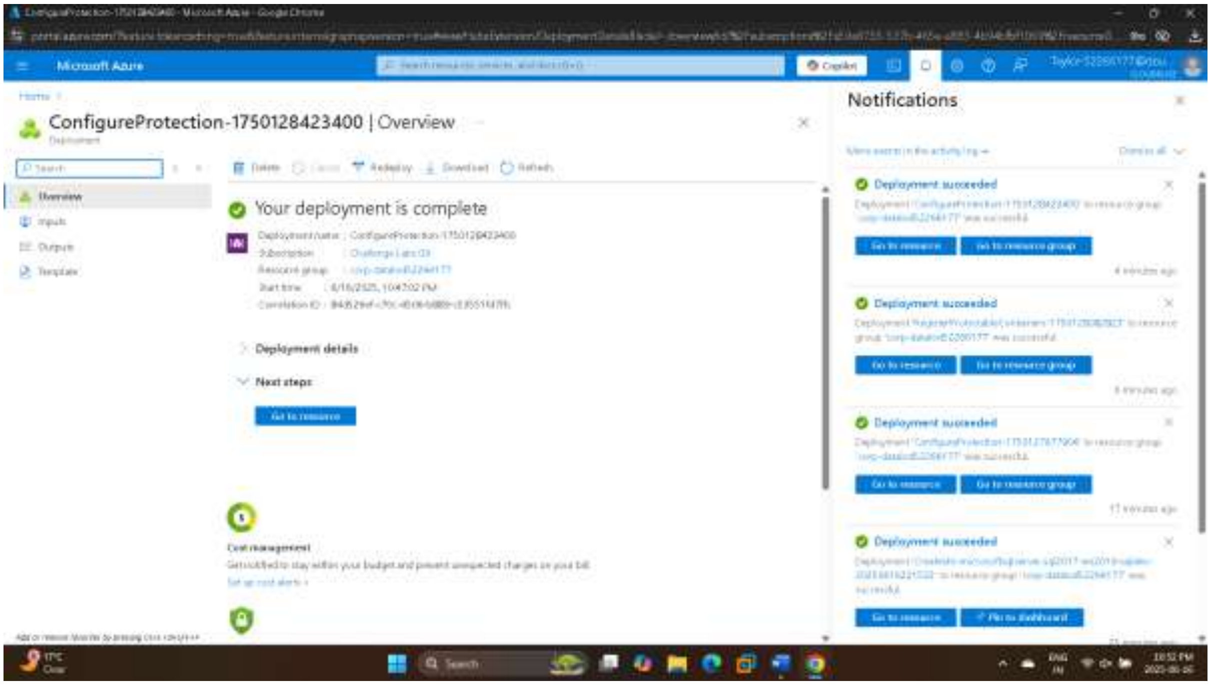
Log backup for DBs in simple recovery model will be skipped

SQL Databases

Database	Instance or AlwaysOn AG
MyDB	win1\MSSQLSERVER

Trigger an initial full backup of the MyDB database by using the Backup now option.

On the Deployment blade, select Go to resource.



ConfigureProtection-1750128423400 | Overview

Your deployment is complete

Deployment details

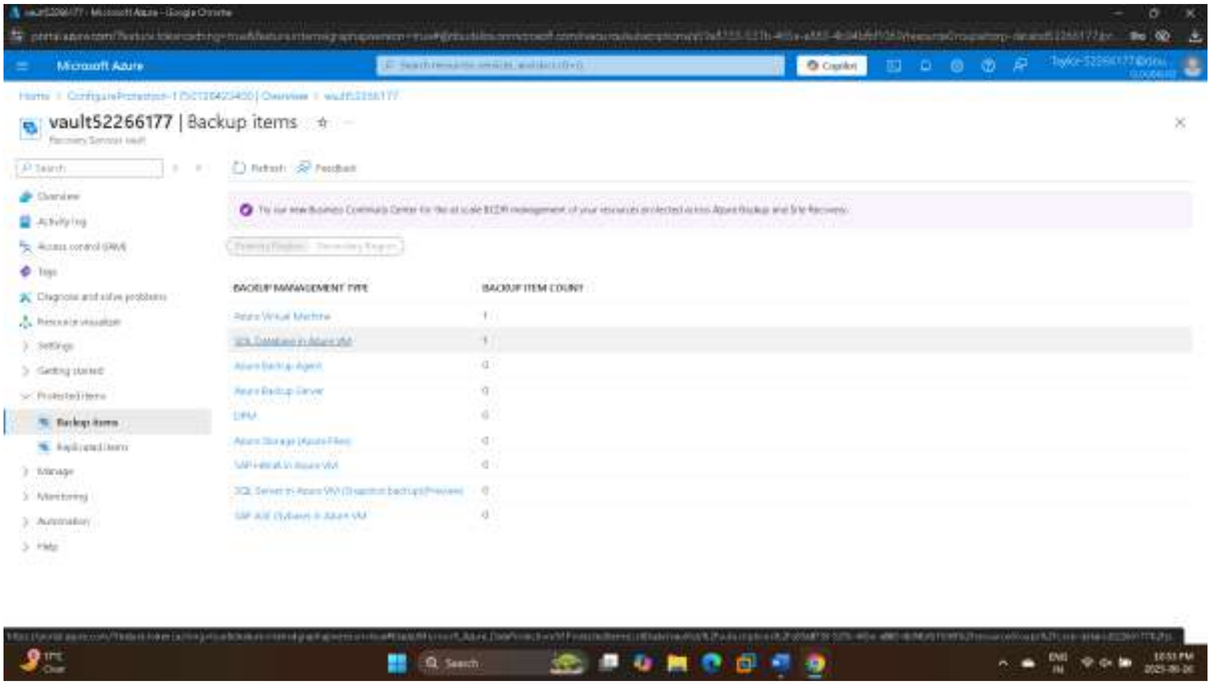
Next steps

Notifications

Deployment succeeded

On the vault52263124 service menu, in Protected items, select Backup items.

On the Backup items page, in BACKUP MANAGEMENT TYPE, select SQL Database in Azure VM.

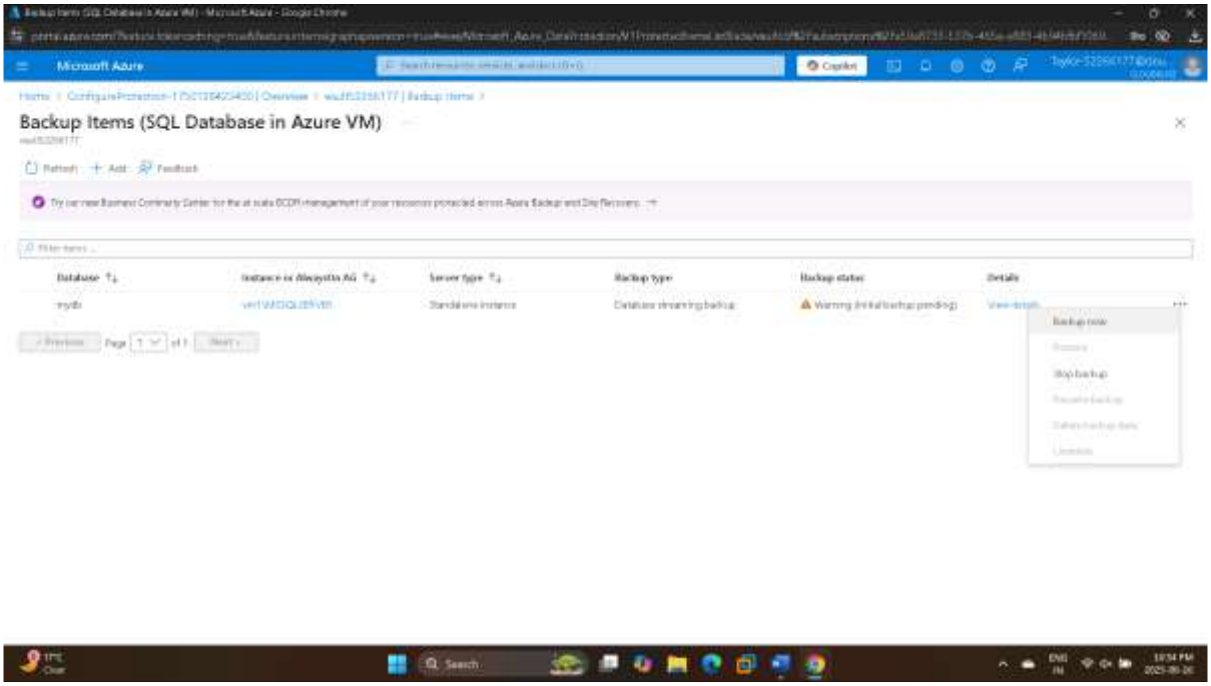


vault52266177 | Backup items

BACKUP MANAGEMENT TYPE	BACKUP ITEM COUNT
Azure Virtual Machine	1
SQL Database in Azure VM	1
Azure Backup Agent	0
Azure Backup Server	0
DPM	0
Azure Storage (Azure Files)	0
SAP HANA in Azure VM	0
SQL Server in Azure VM (Snapshot backup)(Preview)	0
SAP ASE (Sybase) in Azure VM	0

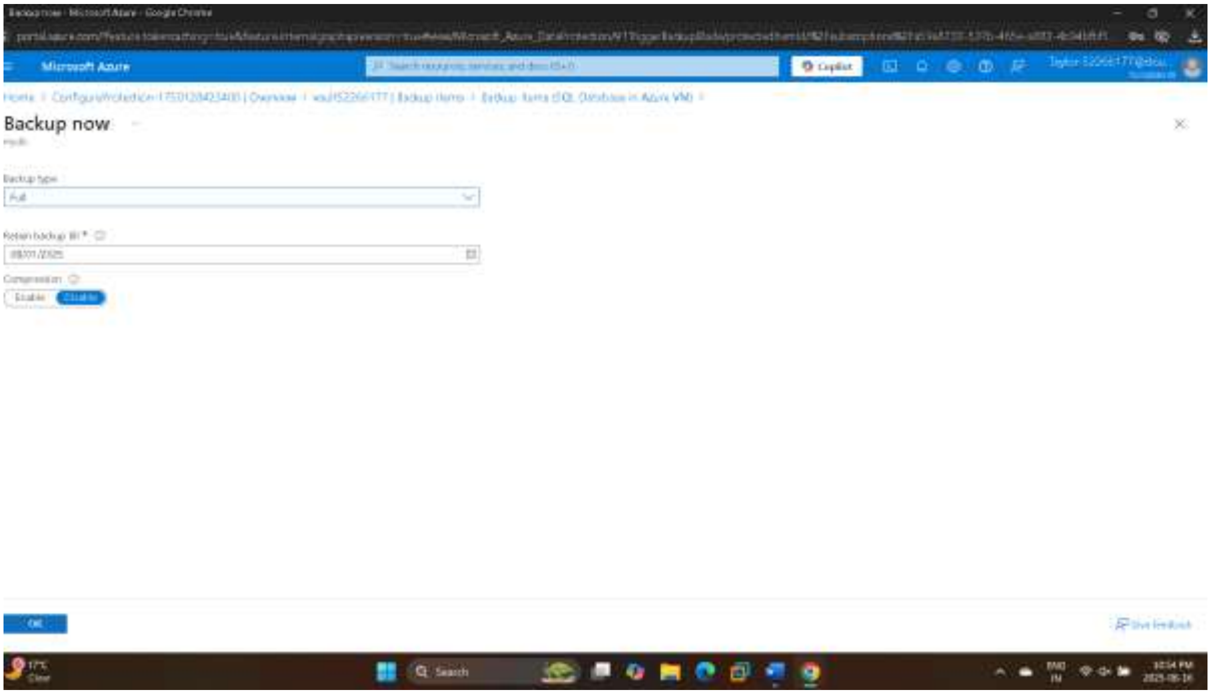
On the Backup Items (SQL Database in Azure VM) blade, to the right of mydb, select the ellipsis (...), and then select Backup now.

On the Backup now blade, select OK.



Backup Items (SQL Database in Azure VM)

Database	Instance or Always0n AG	Server type	Backup type	Backup status	Details
mydb	vm1\MSSQLSERVER	Standalone instance	Database streaming backup	⚠ Warning (Initial backup pending)	View details



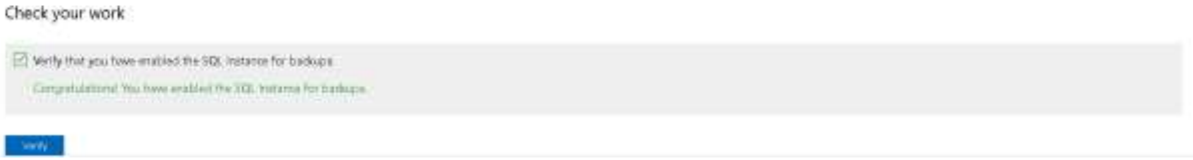
Backup now

mydb

Backup type: Full

Retain backup till *: 08/01/2025

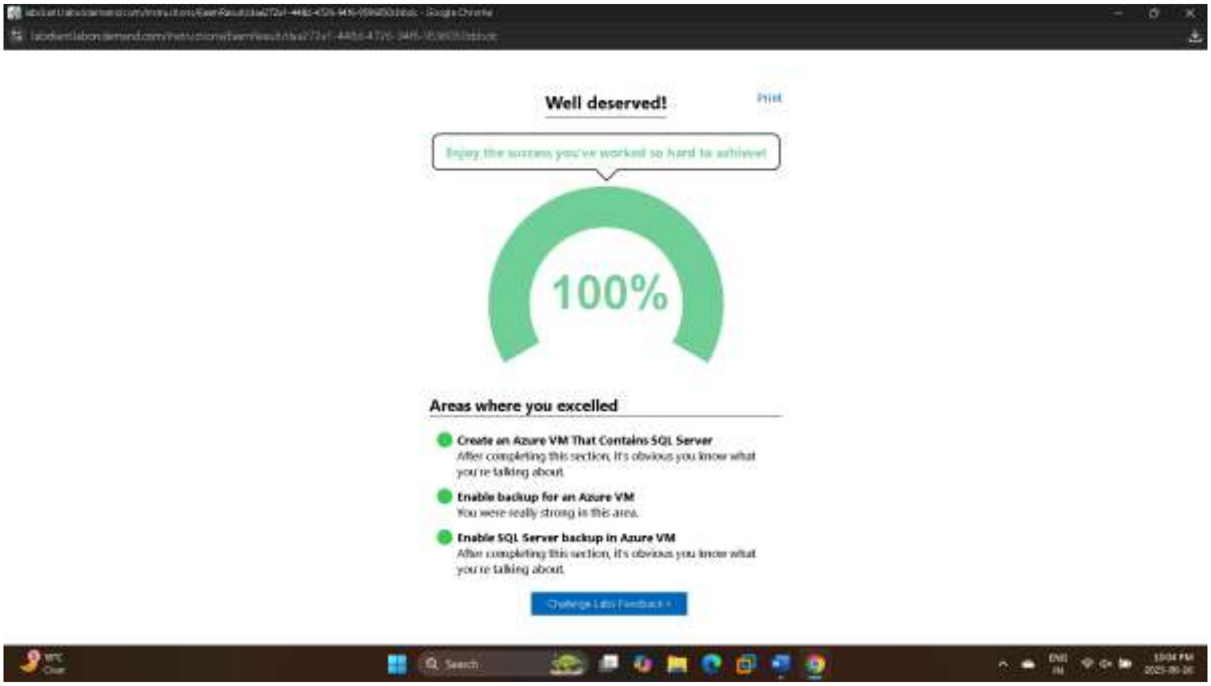
Compression: Enable [✓ Disable]



Check your work

☑ Verify that you have enabled the SQL instance for backups

Congratulations! You have enabled the SQL instance for backups.



Well deserved!

Enjoy the success you've worked so hard to achieve!

100%

Areas where you excelled

- Create an Azure VM That Contains SQL Server
  After completing this section, it's obvious you know what you're talking about.
- Enable backup for an Azure VM
  You were really strong in this area.
- Enable SQL Server backup in Azure VM
  After completing this section, it's obvious you know what you're talking about.

Learning & Opinion

Recovery Services Vault is a centralized solution in Azure to manage and automate backups for virtual machines and databases. It enables the creation of backup policies that define when and how often data is backed up. SQL Server databases running inside VMs can be backed up separately from the VM itself using in-guest backup capabilities. Performing an initial full backup and configuring scheduled backups ensures data resilience and business continuity. Backup policies with retention rules help meet compliance and recovery objectives. Understanding how to configure, monitor, and restore backups is critical for disaster recovery planning in Azure.