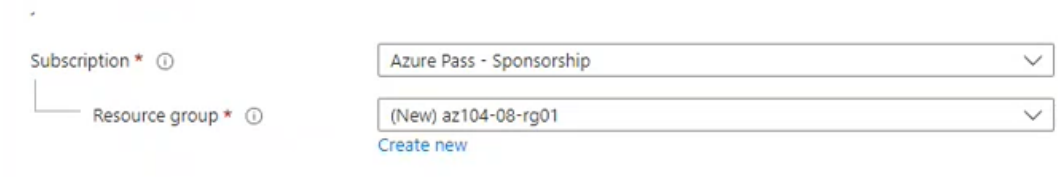
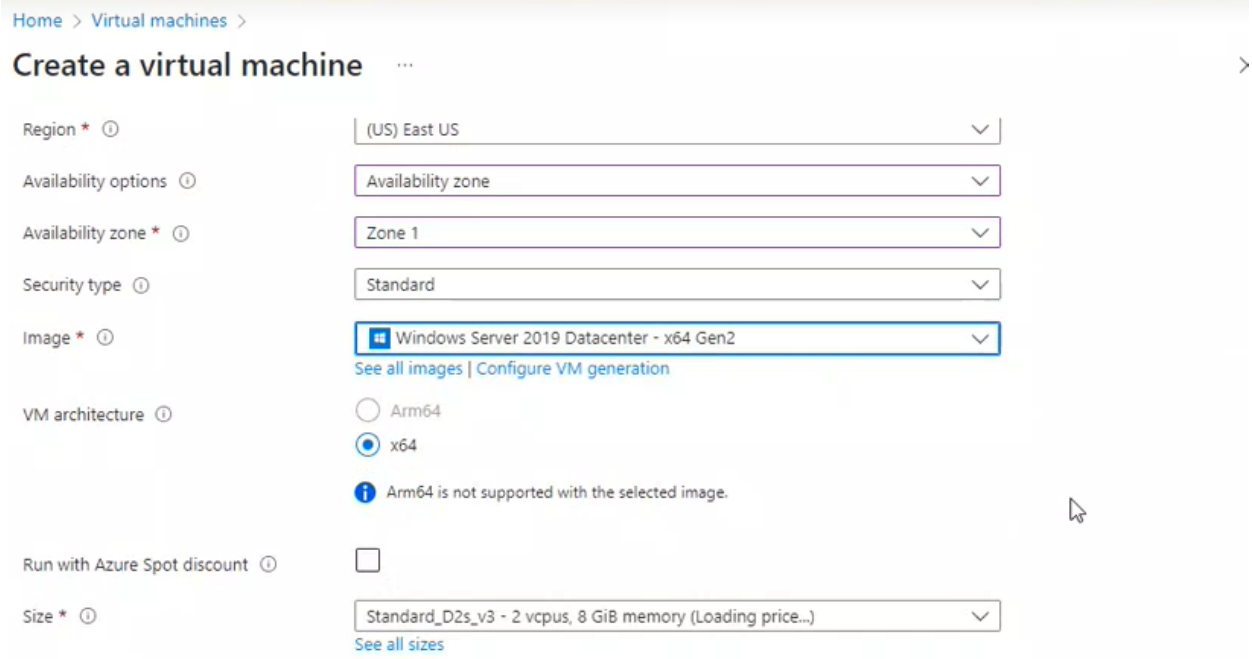
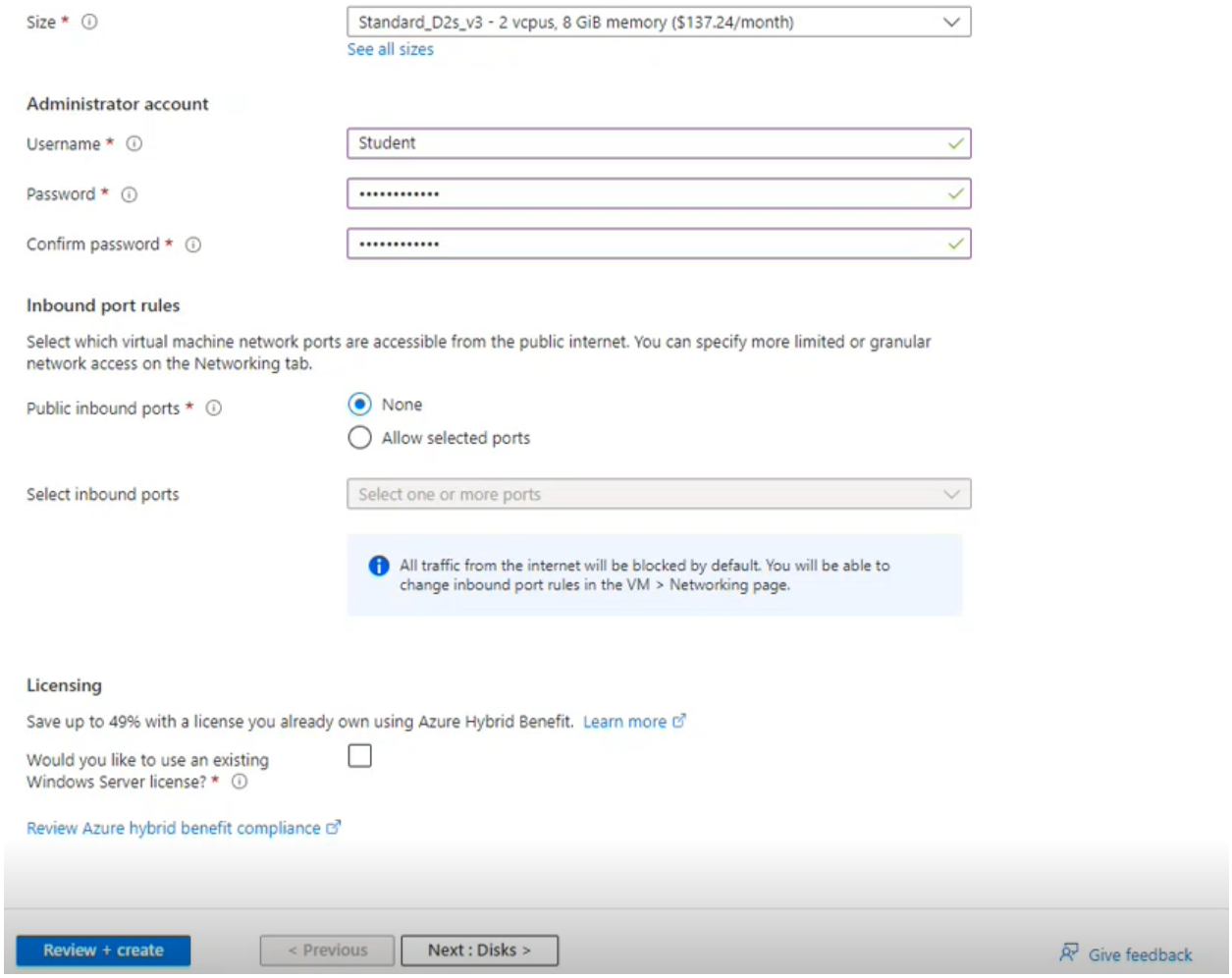
Manage Virtual Machines in Azure

Task 1: *Deploy zone-resilient Azure virtual machines by using the Azure portal and an Azure Resource Manager template*

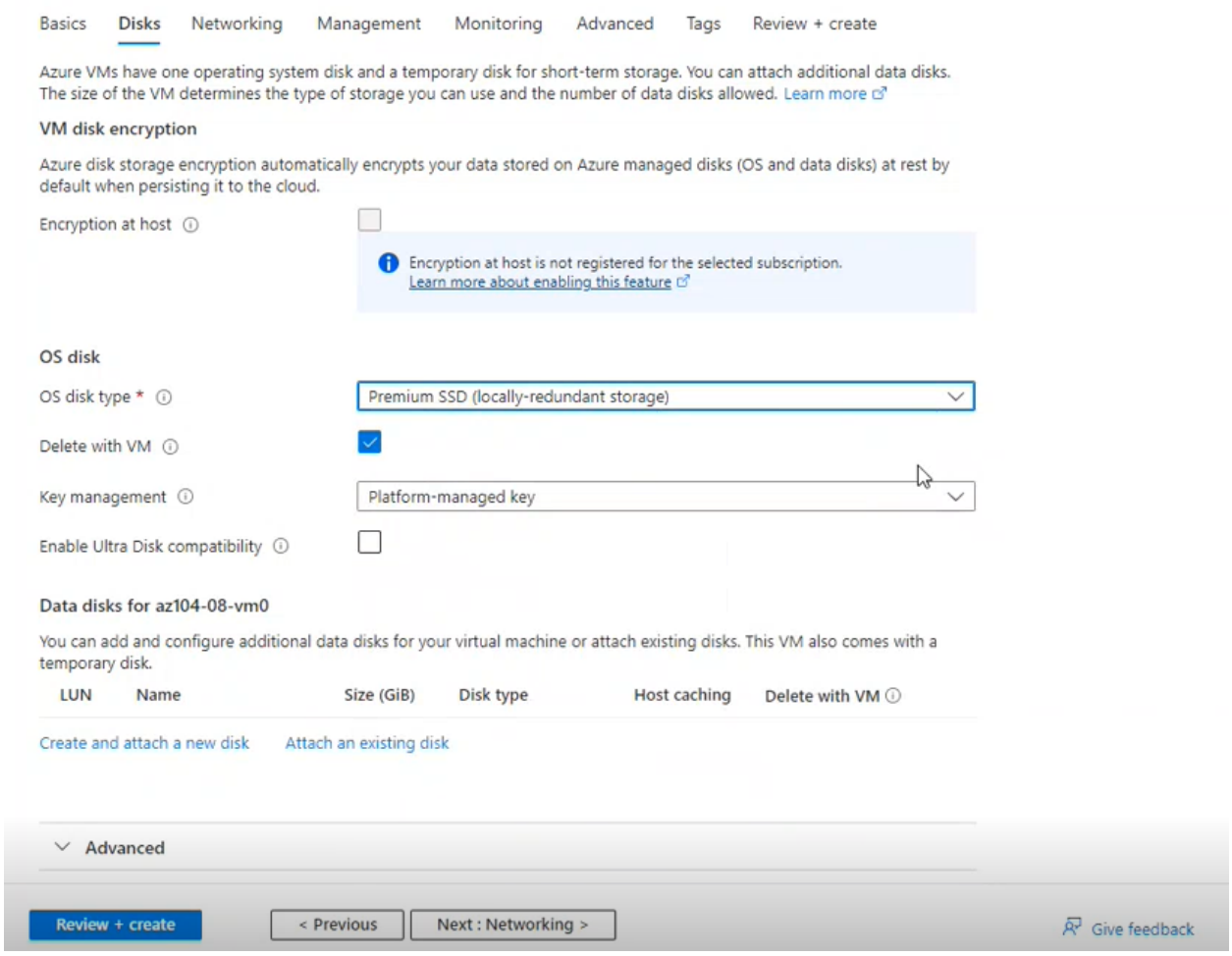
We create the Virtual Machine with the following settings:



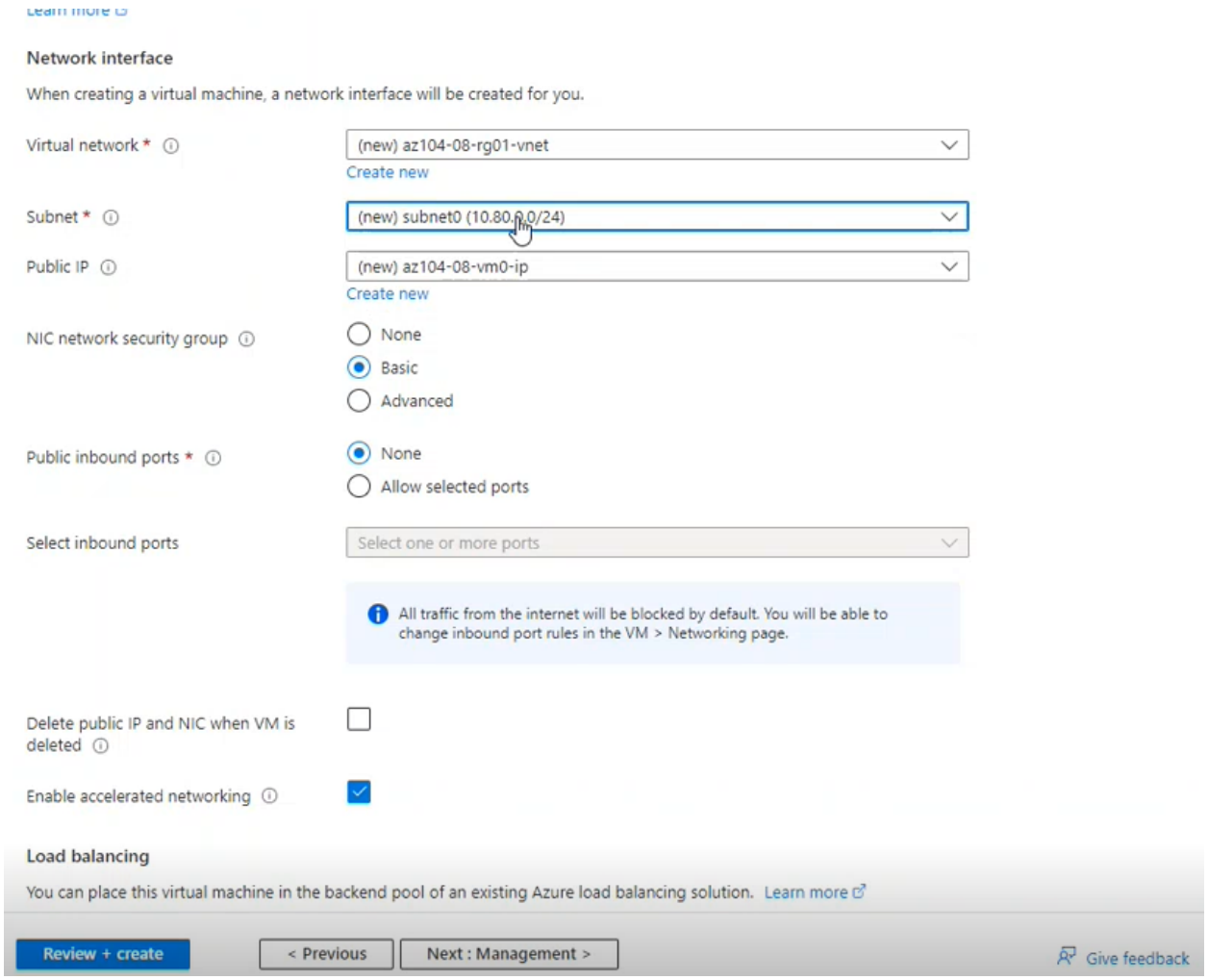




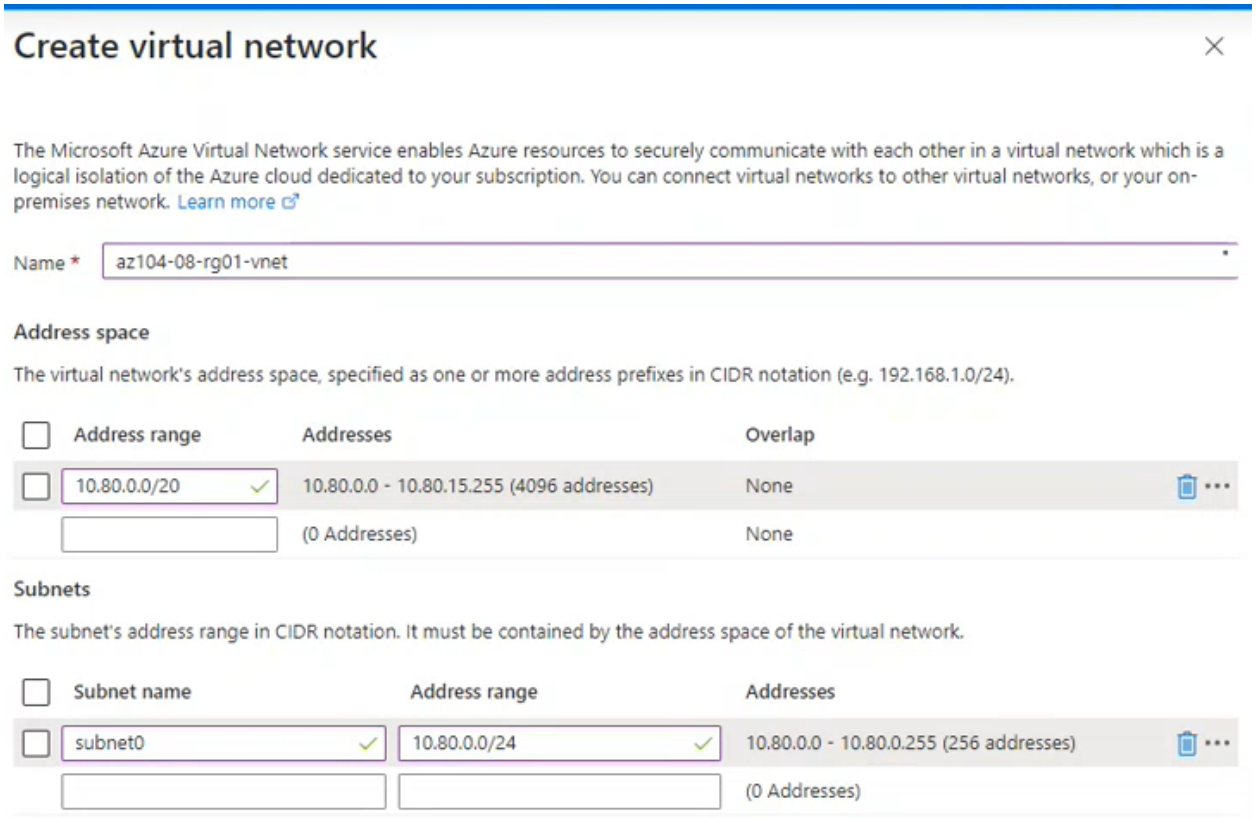
Click Next: Disks > and, on the Disks tab of the Create a virtual machine blade, specify the following settings (leave others with their default values):



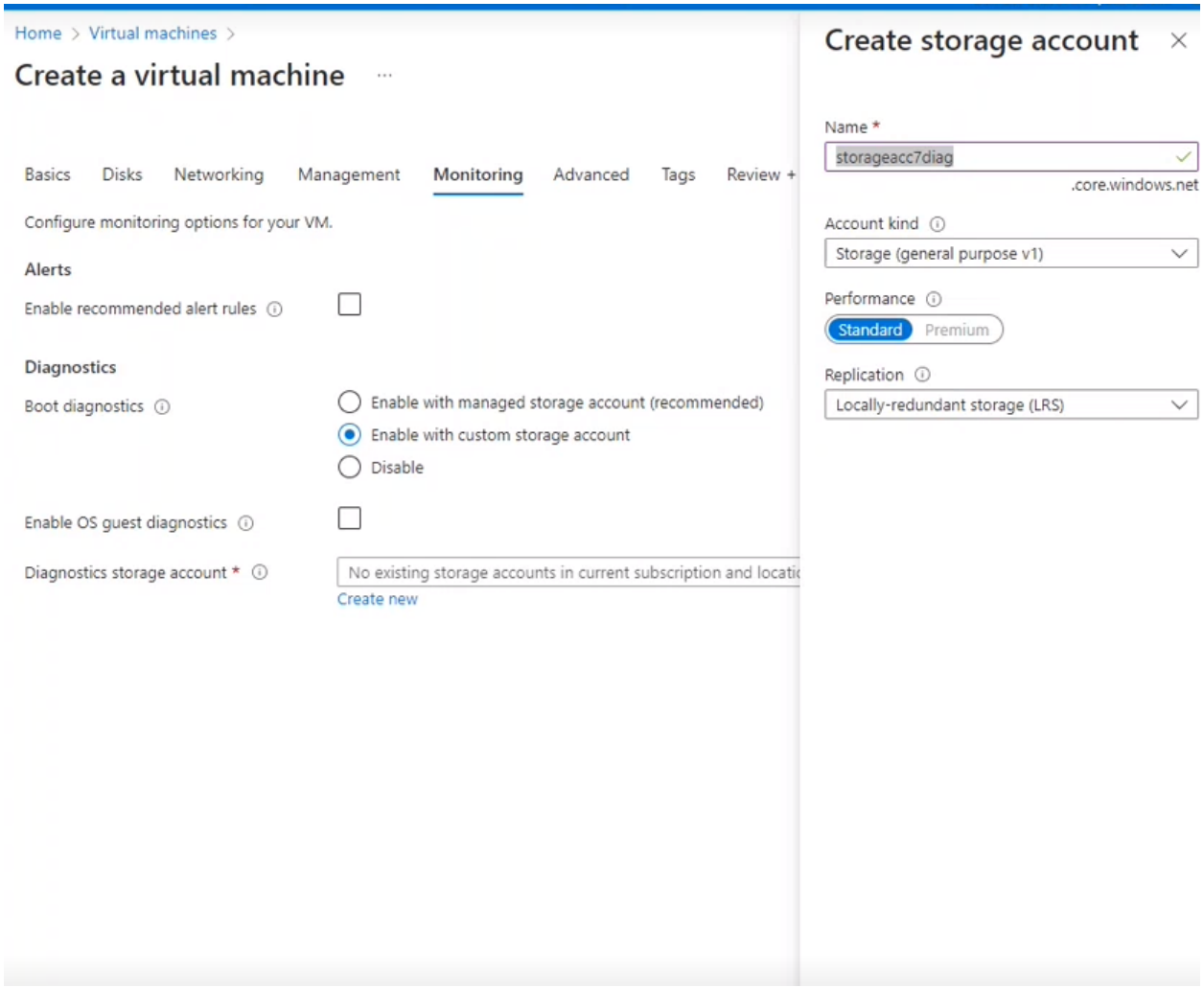
Click Next: Networking > and, on the Networking tab of the Create a virtual machine blade, click Create new below the Virtual network textbox.


Learn more
Network interface
When creating a virtual machine, a network interface will be created for you.
Virtual network *
(new) az104-08-rg01-vnet
Create new
Subnet *
(new) subnet0 (10.80.0.0/24)
Public IP
(new) az104-08-vm0-ip
Create new
NIC network security group
None
Basic
Advanced
Public inbound ports *
None
Allow selected ports
Select inbound ports
Select one or more ports
All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.
Delete public IP and NIC when VM is deleted
Enable accelerated networking
Load balancing
You can place this virtual machine in the backend pool of an existing Azure load balancing solution. Learn more
Review + create
< Previous
Next : Management >
Give feedback

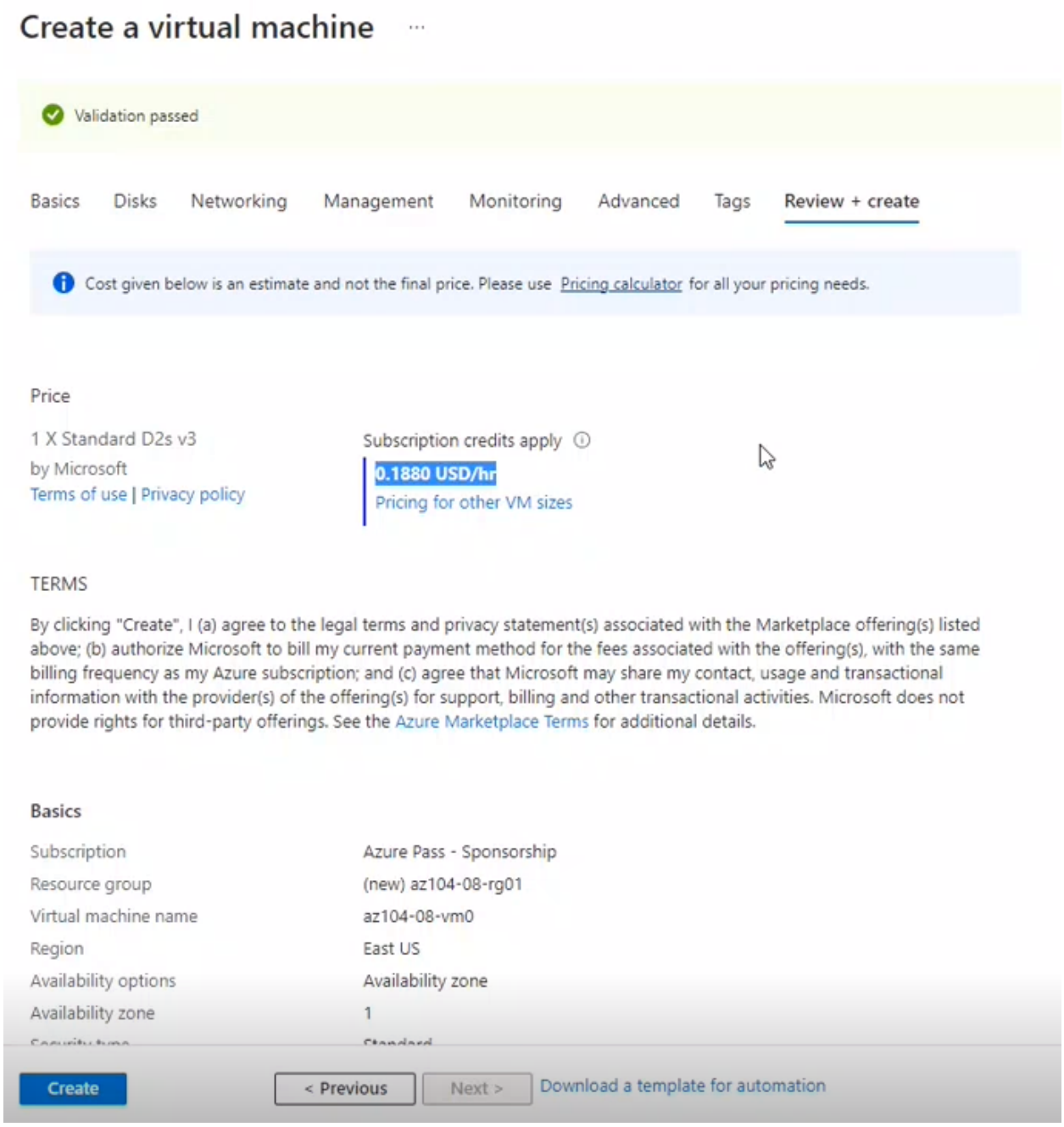
Click OK and, back on the Networking tab of the Create a virtual machine blade, specify the following settings (leave others with their default values):



Click Next: Monitoring > and, on the Monitoring tab of the Create a virtual machine blade, specify the following settings (leave others with their default values):



Once the validation is successful, we can continue on creating the Virtual Machine



On the Custom Deployment blade, we set up the following settings:

Custom deployment

Deploy from a custom template

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

Subscription * : Azure Pass - Sponsorship

Resource group * : az104-08-rg01

Create new

Instance details

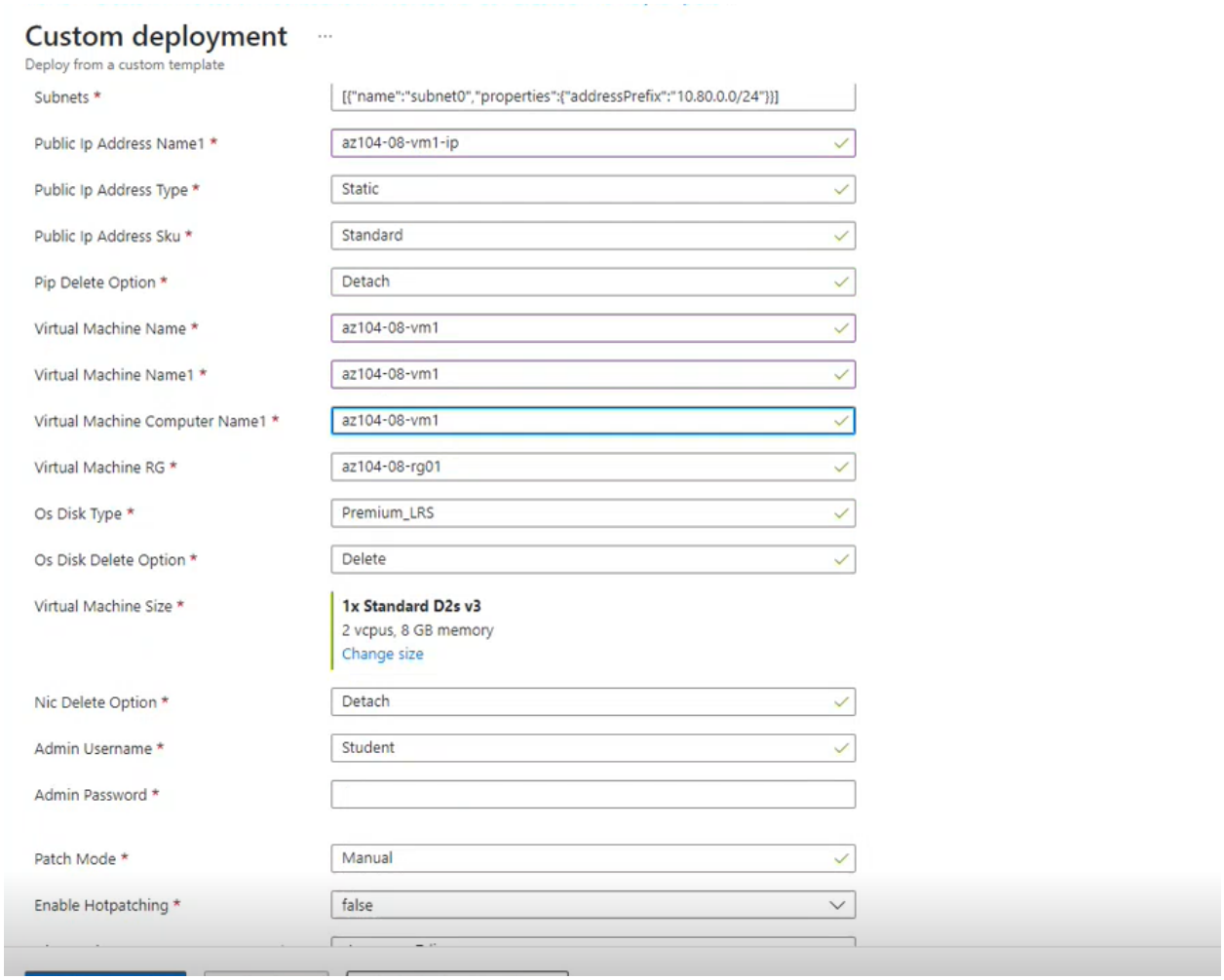
Region * : (US) East US

Location * : eastus

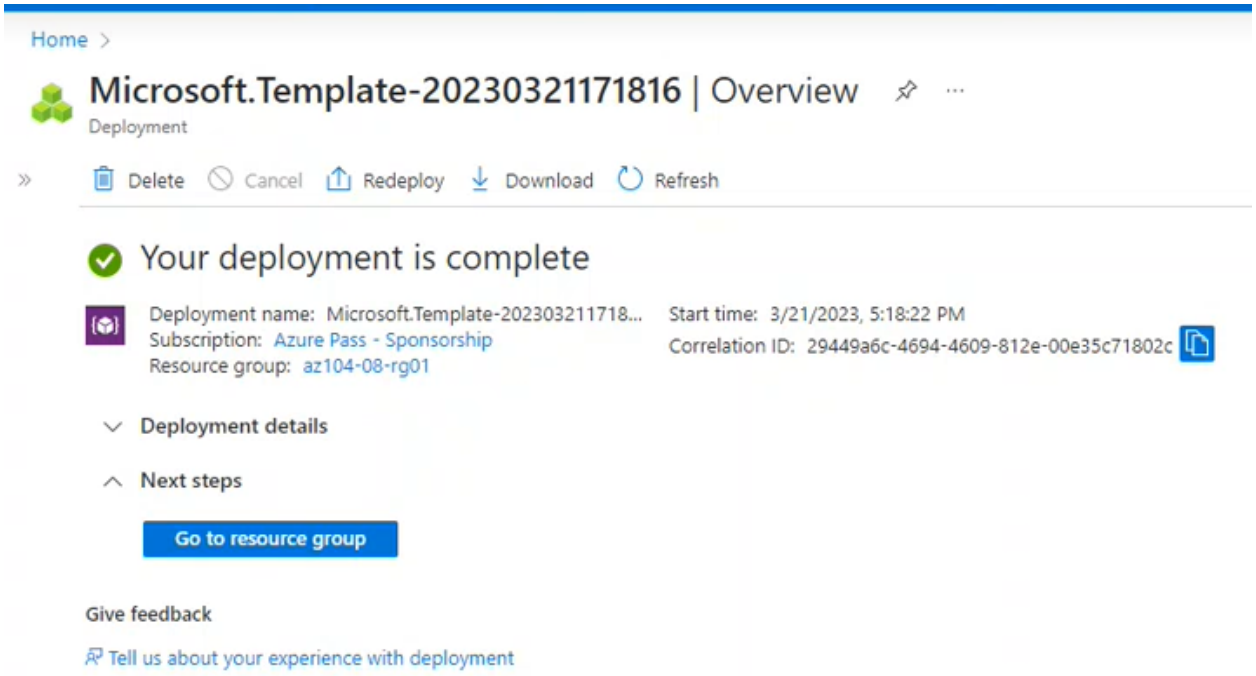
Network Interface Name1 * : az104-08-vm1-nic1

Network Security Group Name * : az104-08-vm0-nsg

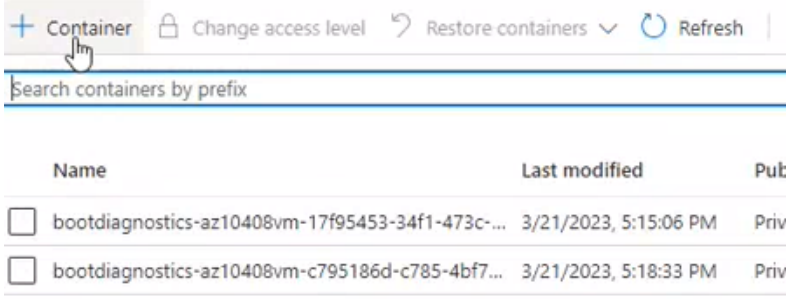
Network Security Group Rules * : []

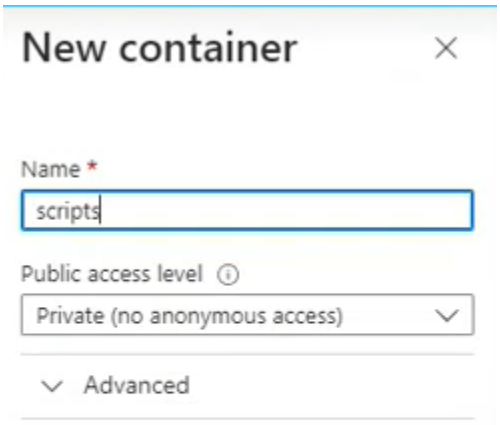


*The Deployment is **<u>complete</u>**.*

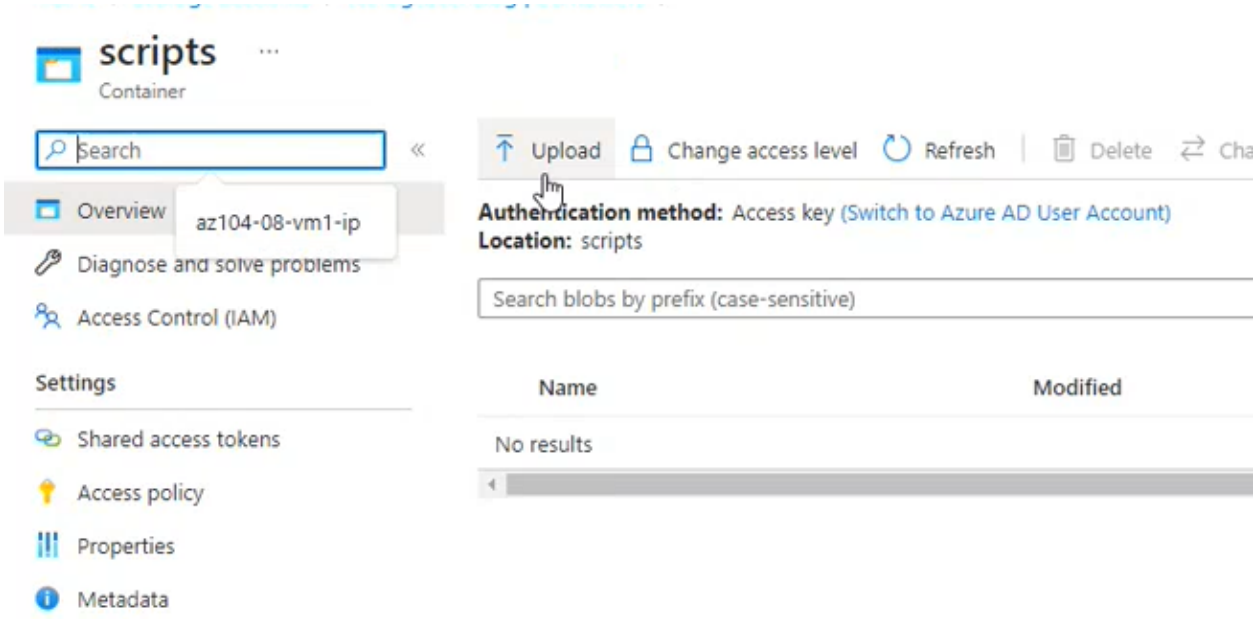


Task 2: *Configure Azure virtual machines by using virtual machine extensions*

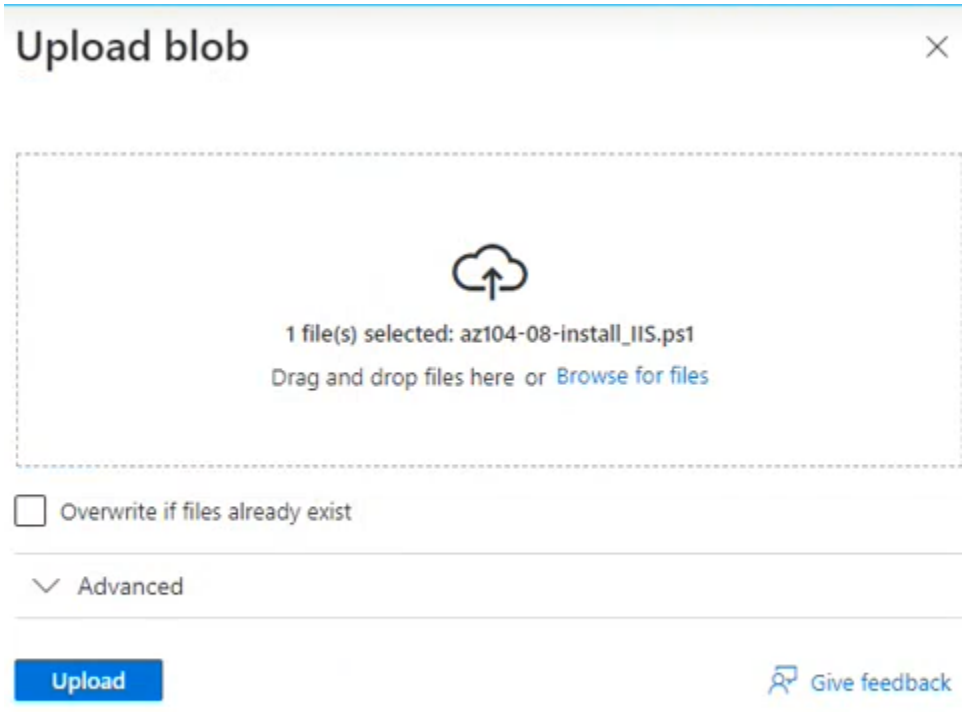




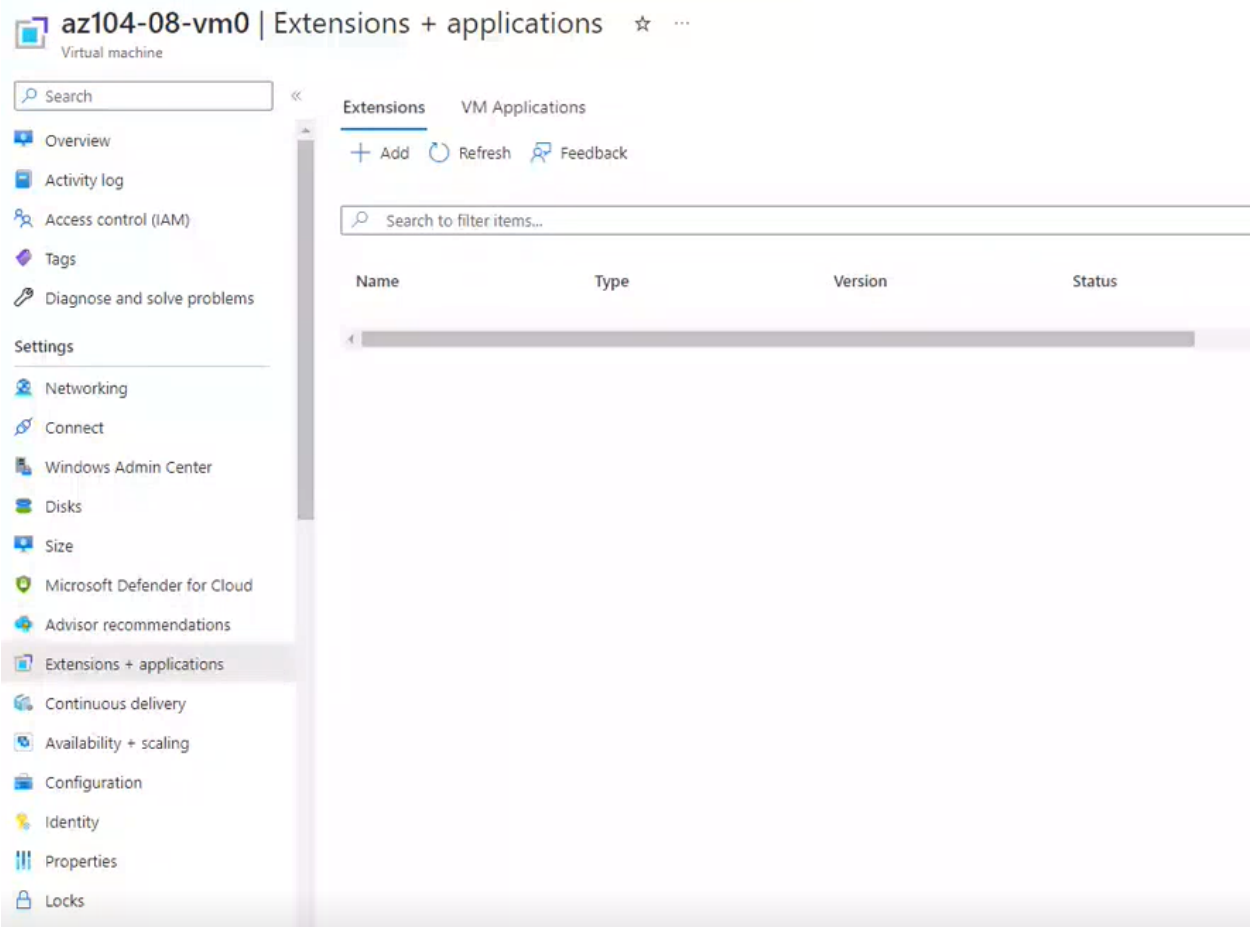
Once we create the scripts storage account, we click on "Create" and continue to the next step.

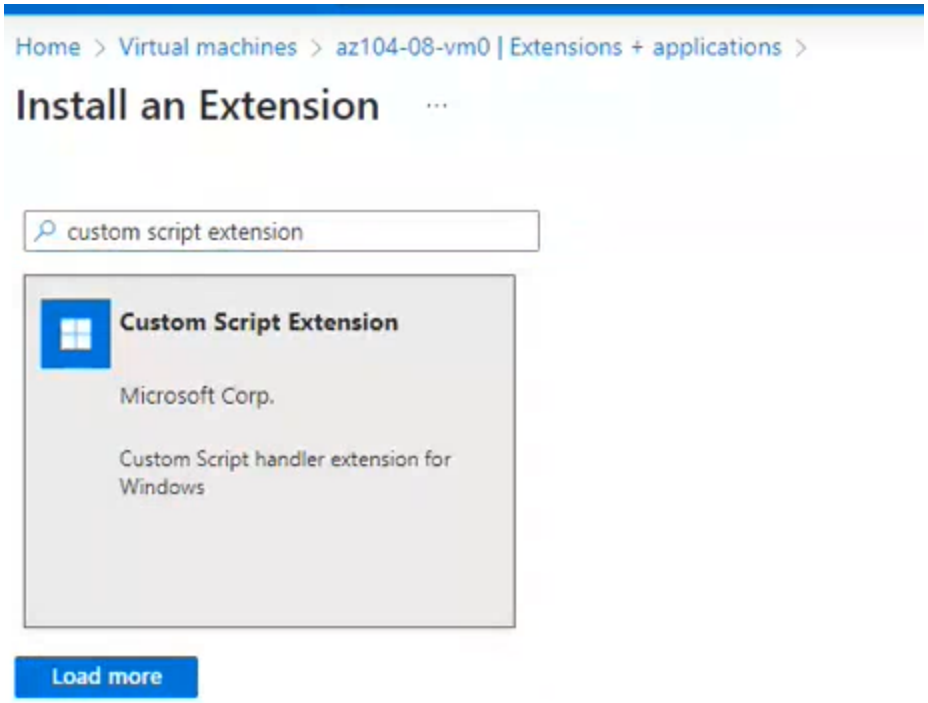


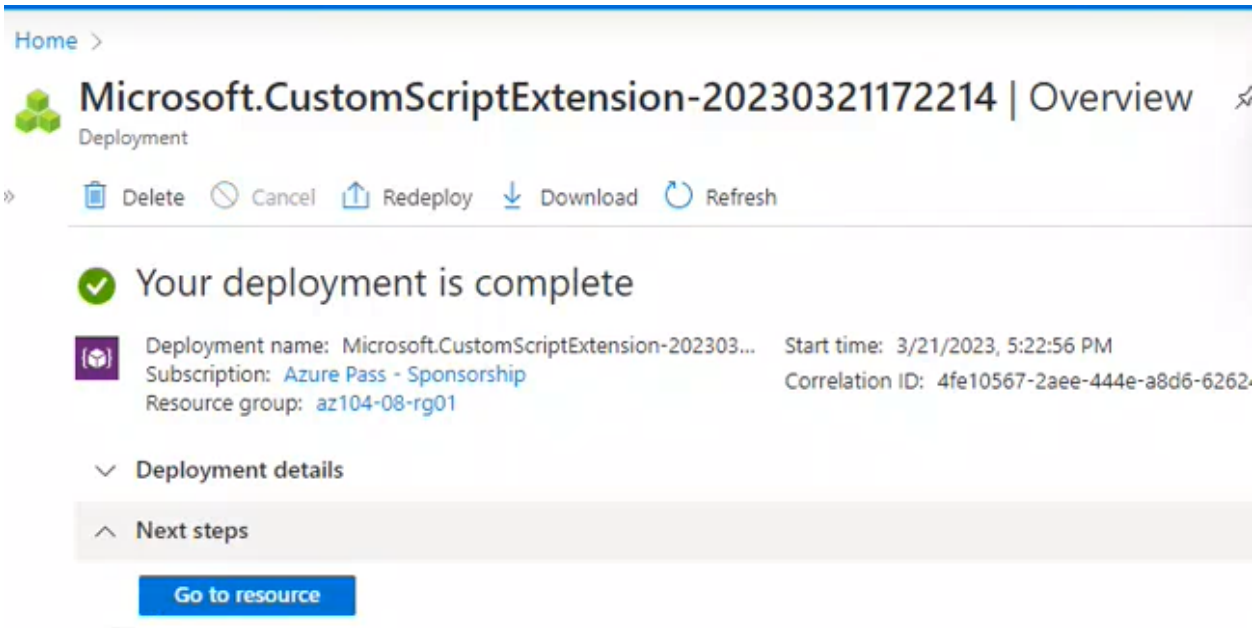
We upload the az104-08-install_IIS.ps1 file.



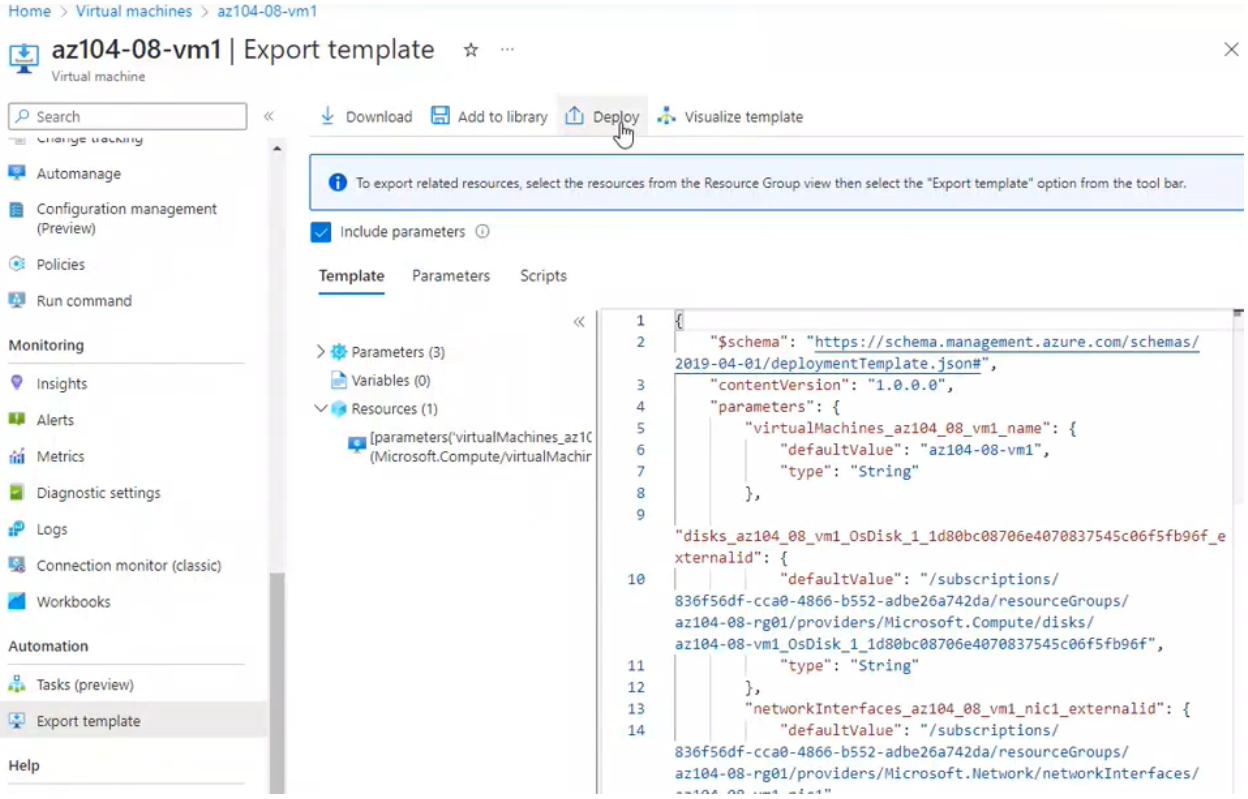
*On the az104-08-vm0 virtual machine blade, in the Settings section, click **Extensions + applications**, and the click + **Add***







We deploy the custom



We add the following code after the “resources” line

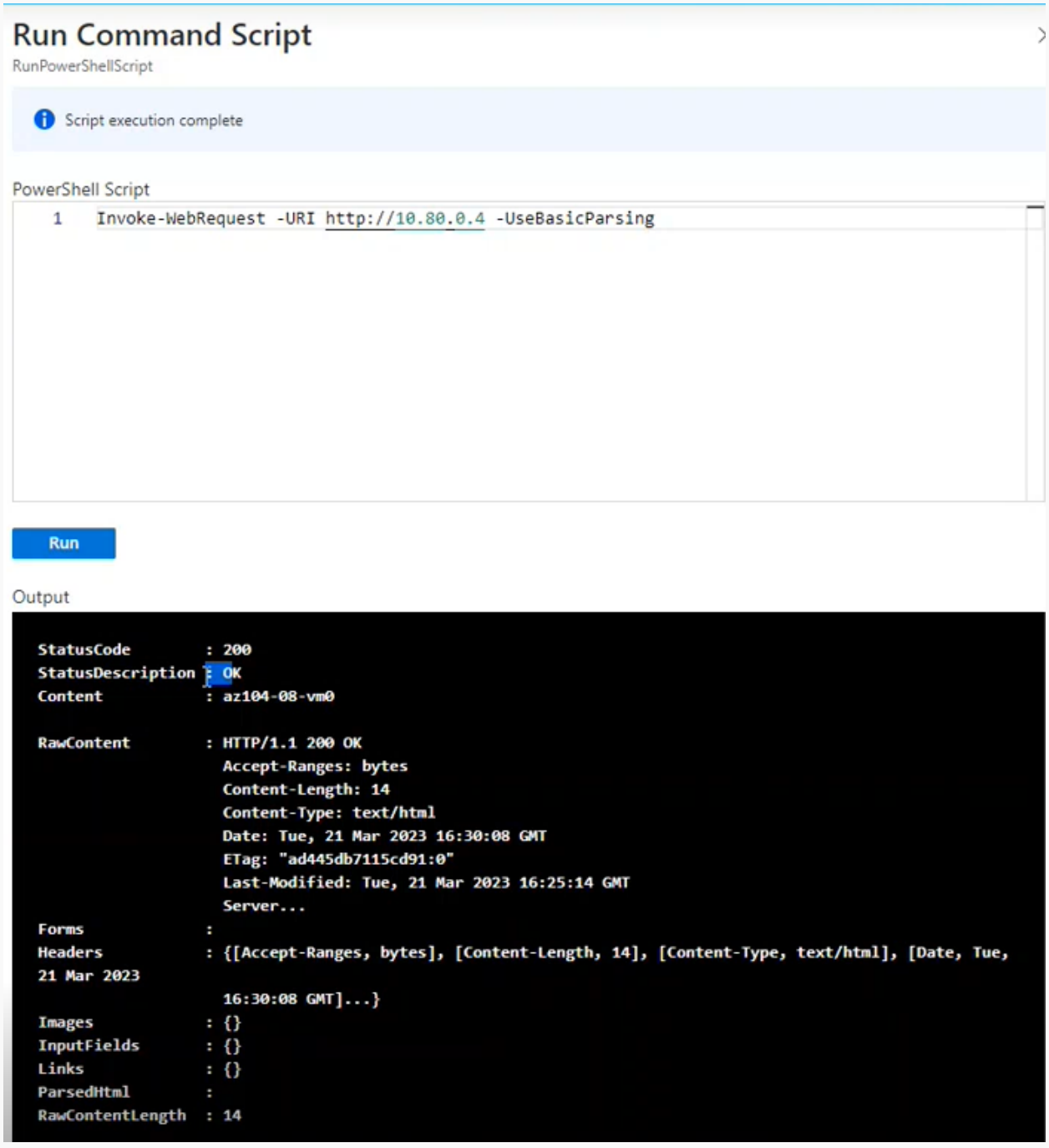
```
    {
        "type": "Microsoft.Compute/virtualMachines/extensions",
        "name": "az104-08-vm1/customScriptExtension",
        "apiVersion": "2018-06-01",
        "location": "[resourceGroup().location]",
        "dependsOn": [
            "az104-08-vm1"
        ],
        "properties": {
            "publisher": "Microsoft.Compute",
            "type": "CustomScriptExtension",
            "typeHandlerVersion": "1.7",
```

```
                "autoUpgradeMinorVersion": true,

                "settings": {

                    "commandToExecute": "powershell.exe
Install-WindowsFeature -name Web-Server -IncludeManagementTools &&
powershell.exe remove-item 'C:\\inetpub\\wwwroot\\iisstart.htm' &&
powershell.exe Add-Content -Path 'C:\\inetpub\\wwwroot\\iisstart.htm'
-Value $('Hello World from ' + $env:computername)"

                }

            }

        },
```

```
        "disks_az104_08_vm1_OsDisk_1_1d80bc08706e4070837545c06f5fb96f_externalid": {
            "defaultValue": "/subscriptions/836f56df-cca0-4866-b552-adbe26a742da/resourceGroups/az104-08-rg01/providers/Microsoft.Compute/disks/az104-08-vm1_OsDisk_1_1d80bc08706e4070837545c06f5fb96f",
            "type": "String"
        },
        "networkInterfaces_az104_08_vm1_nic1_externalid": {
            "defaultValue": "/subscriptions/836f56df-cca0-4866-b552-adbe26a742da/resourceGroups/az104-08-rg01/providers/Microsoft.Network/networkInterfaces/az104-08-vm1-nic1",
            "type": "String"
        }
    },
    "variables": {},
    "resources": [
        {
            "type": "Microsoft.Compute/virtualMachines/extensions",
            "name": "az104-08-vm1/customScriptExtension",
            "apiVersion": "2018-06-01",
            "location": "[resourceGroup().location]",
            "dependsOn": [
                "az104-08-vm1"
            ],
            "properties": {
                "publisher": "Microsoft.Compute",
                "type": "CustomScriptExtension",
                "typeHandlerVersion": "1.7",
                "autoUpgradeMinorVersion": true,
                "settings": {
                    "commandToExecute": "powershell.exe Install-WindowsFeature -name Web-Server -IncludeManagementTools && powershell.exe remove-item 'C:\\inetpub\\wwwroot\\iisstart.htm' && powershell.exe Add-Content -Path 'C:\\inetpub\\wwwroot\\iisstart.htm' -Value $('Hello World from ' + $env:computername)"
                }
```

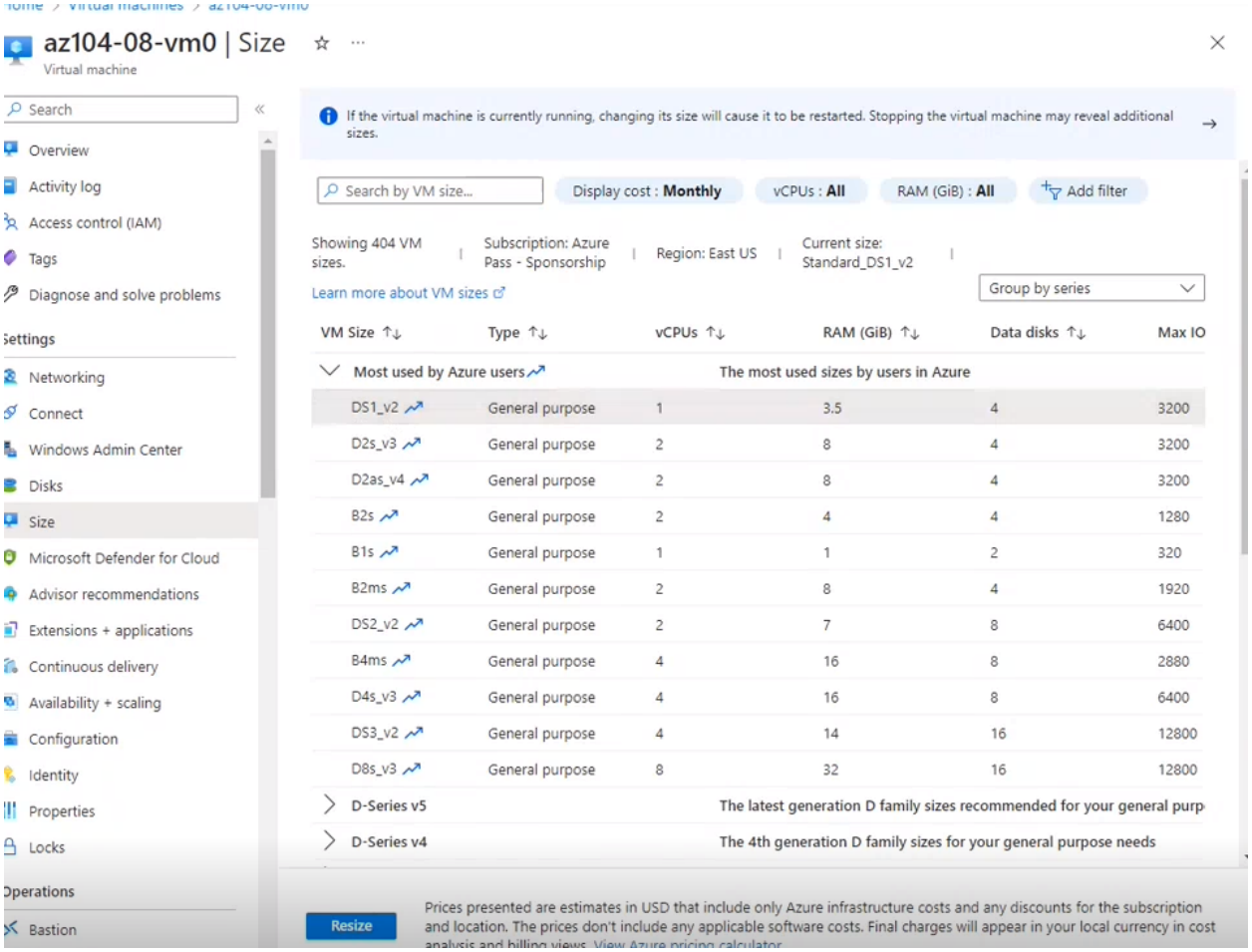
On the Run Command Script blade, type the following and click Run to access the web site hosted on az104-08-vm0:

```
Invoke-WebRequest -URI http://10.80.0.4 -UseBasicParsing
```

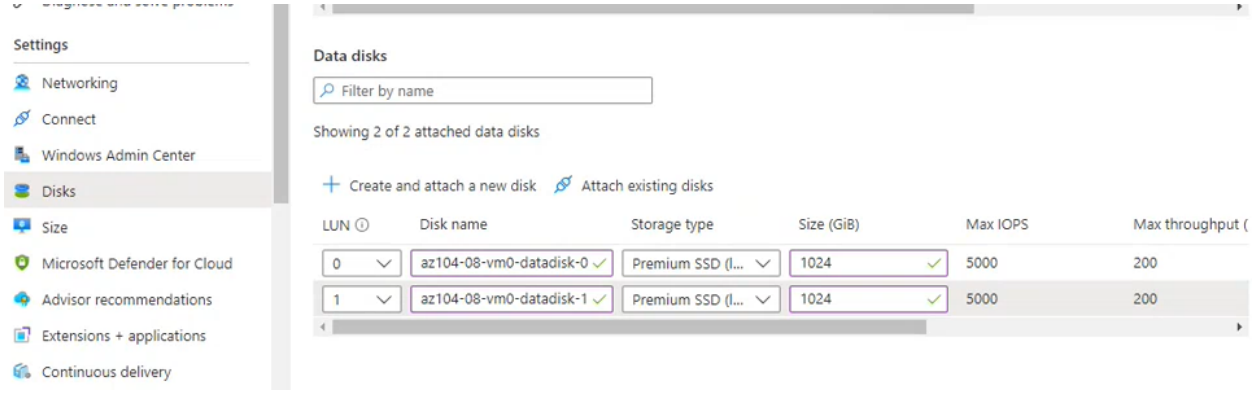


***Task 3**: Scale compute and storage for Azure virtual machines*

On the az104-08-vm0 virtual machine blade, click Size and set the virtual machine size to Standard DS1_v2 and click Resize



On the az104-08-vm0 virtual machine blade, click Disks, Under Data disks click + Create and attach a new disk.



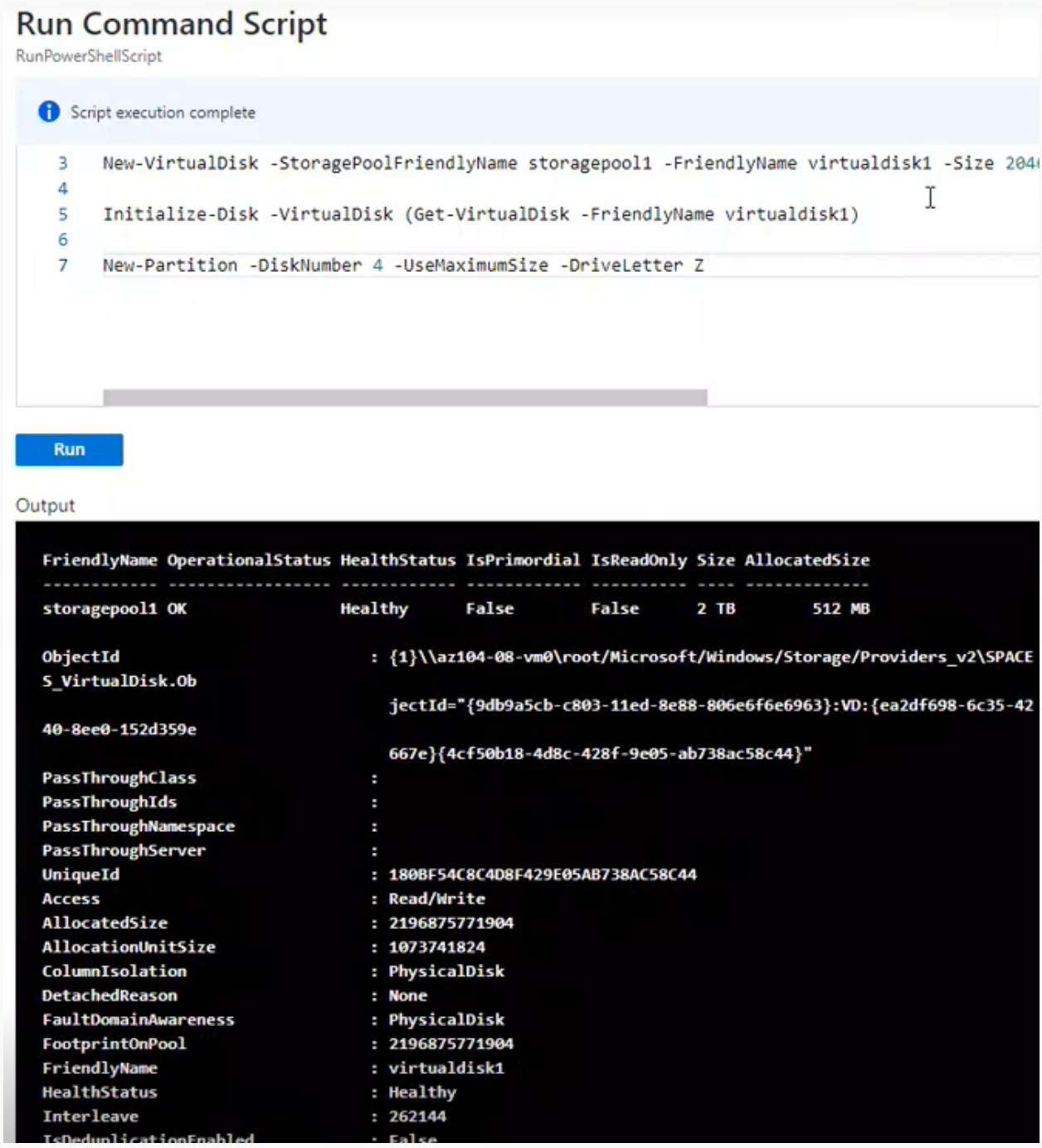
On the Run Command Script blade, type the following and click Run to create a drive Z: consisting of the two newly attached disks with the simple layout and fixed provisioning:

```
New-StoragePool -FriendlyName storagepool1 -StorageSubsystemFriendlyName "Windows Storage*" -PhysicalDisks (Get-PhysicalDisk -CanPool $true)
```

```
New-VirtualDisk -StoragePoolFriendlyName storagepool1 -FriendlyName virtualdisk1 -Size 2046GB -ResiliencySettingName Simple -ProvisioningType Fixed
```

```
Initialize-Disk -VirtualDisk (Get-VirtualDisk -FriendlyName virtualdisk1)
```

```
New-Partition -DiskNumber 4 -UseMaximumSize -DriveLetter Z
```



`When the OperationalStatus displays OK, the drive creation was successful.`

On the Edit template blade, in the section displaying the content of the template, replace the line 30 `"vmSize": "Standard_D2s_v3"` *with the following line):*

```
"vmSize": "Standard_DS1_v2"
```

On the Edit template blade, in the section displaying the content of the template, replace line (`"dataDisks": [ ]` line) with the following code :

```
                "dataDisks": [
                    {
                        "lun": 0,
                        "name": "az104-08-vm1-datadisk0",
                        "diskSizeGB": "1024",
                        "caching": "ReadOnly",
                        "createOption": "Empty"
                    },
                    {
                        "lun": 1,
                        "name": "az104-08-vm1-datadisk1",
                        "diskSizeGB": "1024",
                        "caching": "ReadOnly",
                        "createOption": "Empty"
                    }
                ]
```

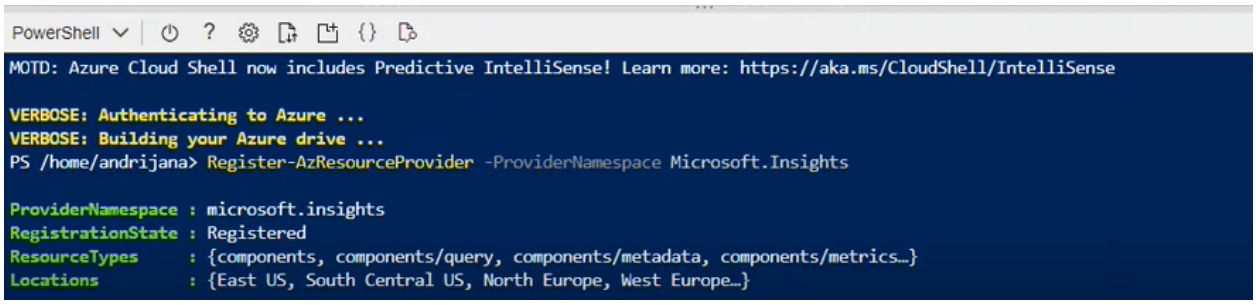
```
44                          "managedDisk": {
45                              "storageAccountType": "Premium_LRS",
46                              "id": "[parameters
    ('disks_az104_08_vm1_OsDisk_1_1d80bc08706e4070837545c06f5fb96f_externalid')]"
47                          },
48                          "deleteOption": "Delete",
49                          "diskSizeGB": 127
50                      },
51                      "dataDisks": [
52                      {
53                        "lun": 0,
54                        "name": "az104-08-vm1-datadisk0",
55                        "diskSizeGB": "1024",
56                        "caching": "ReadOnly",
57                        "createOption": "Empty"
58                      },
59                      {
60                        "lun": 1,
61                        "name": "az104-08-vm1-datadisk1",
62                        "diskSizeGB": "1024",
63                        "caching": "ReadOnly",
64                        "createOption": "Empty"
65                      }
66                    ]
```

In the next step, we create another drive Z, following the same procedure from previously.

Task 4: *Register the Microsoft.Insights and Microsoft.AlertsManagement resource providers*

From the Cloud Shell pane, run the following to register the Microsoft.Insights and Microsoft.AlertsManagement resource providers.

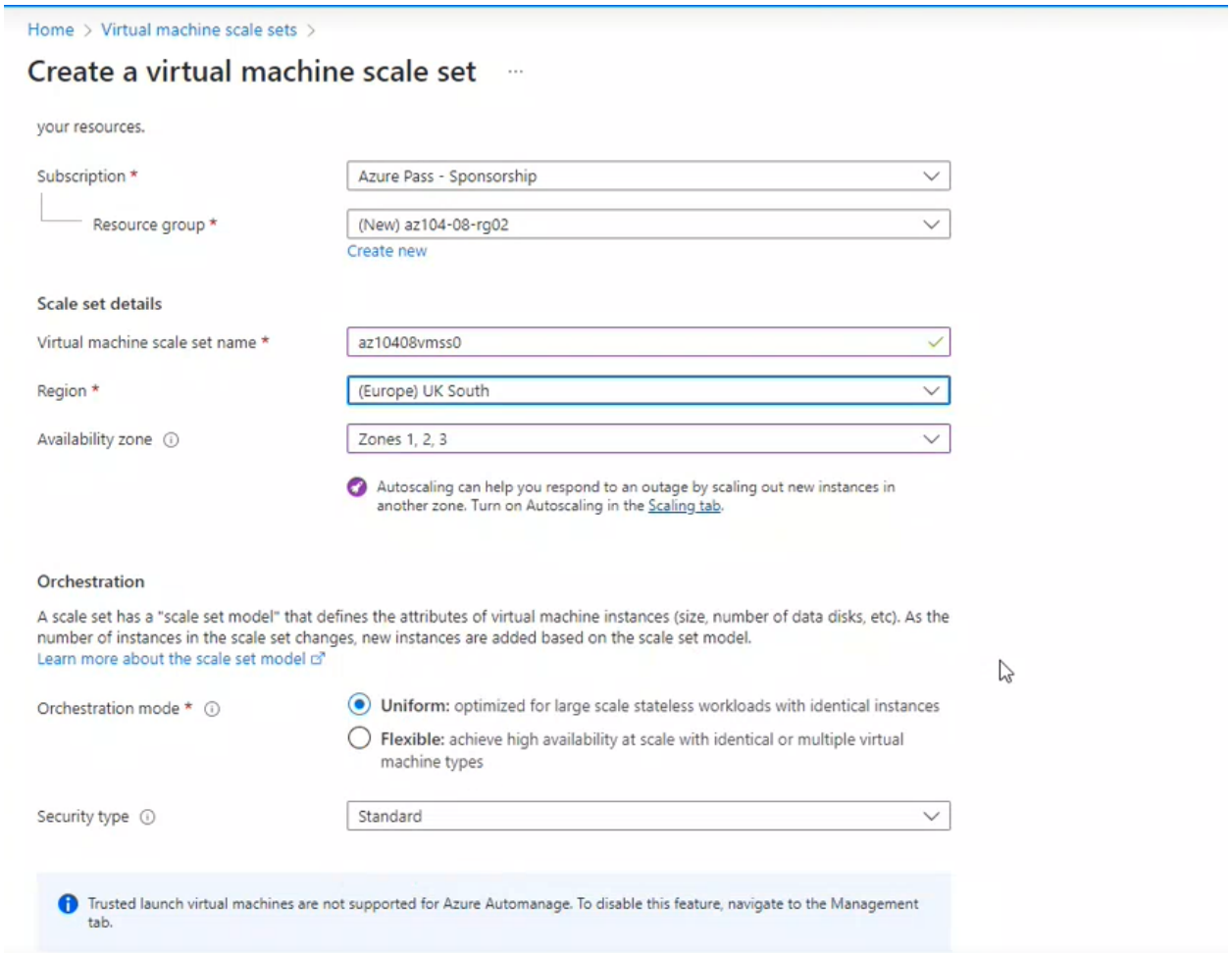
```
Register-AzResourceProvider -ProviderNamespace Microsoft.Insights
```

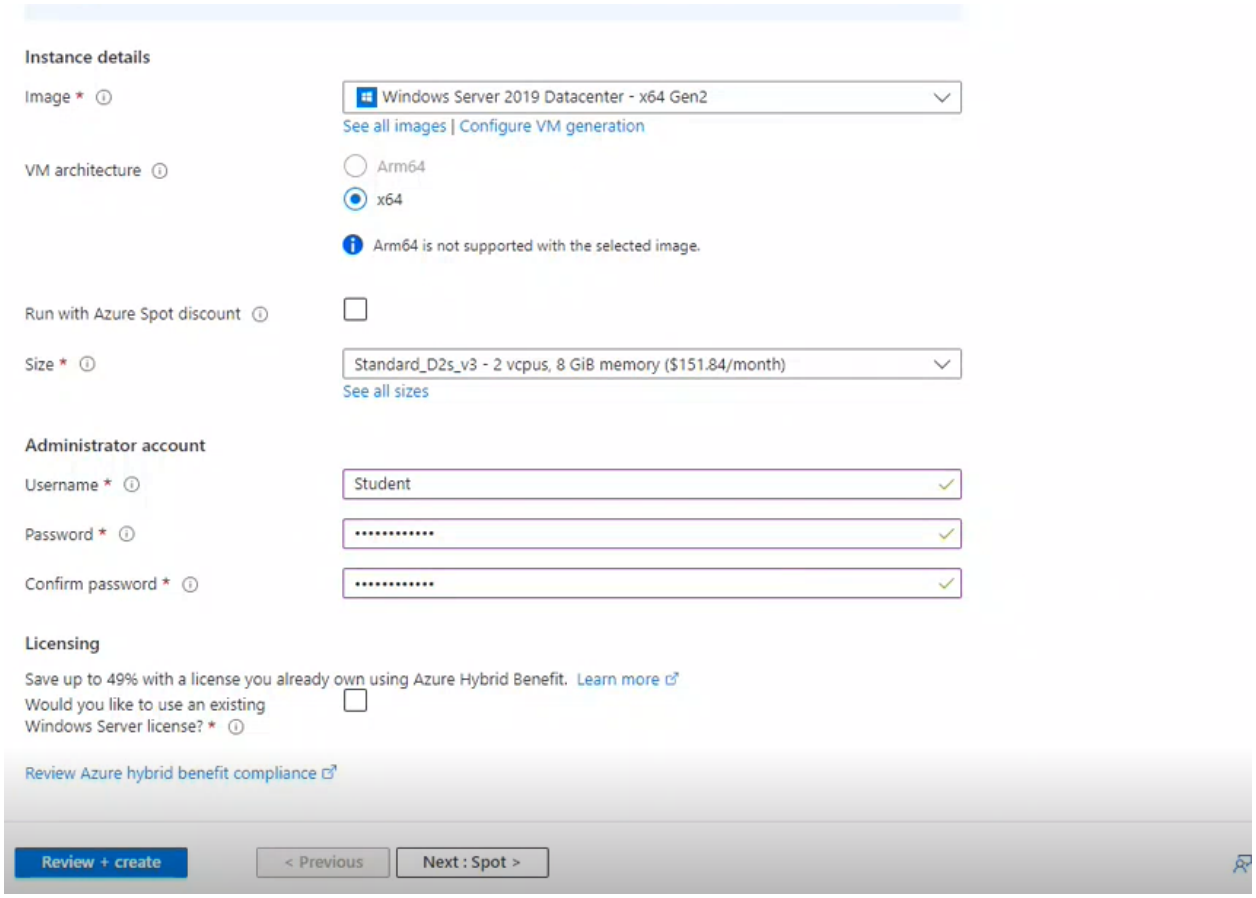


```
Register-AzResourceProvider -ProviderNamespace Microsoft.AlertsManagement
```

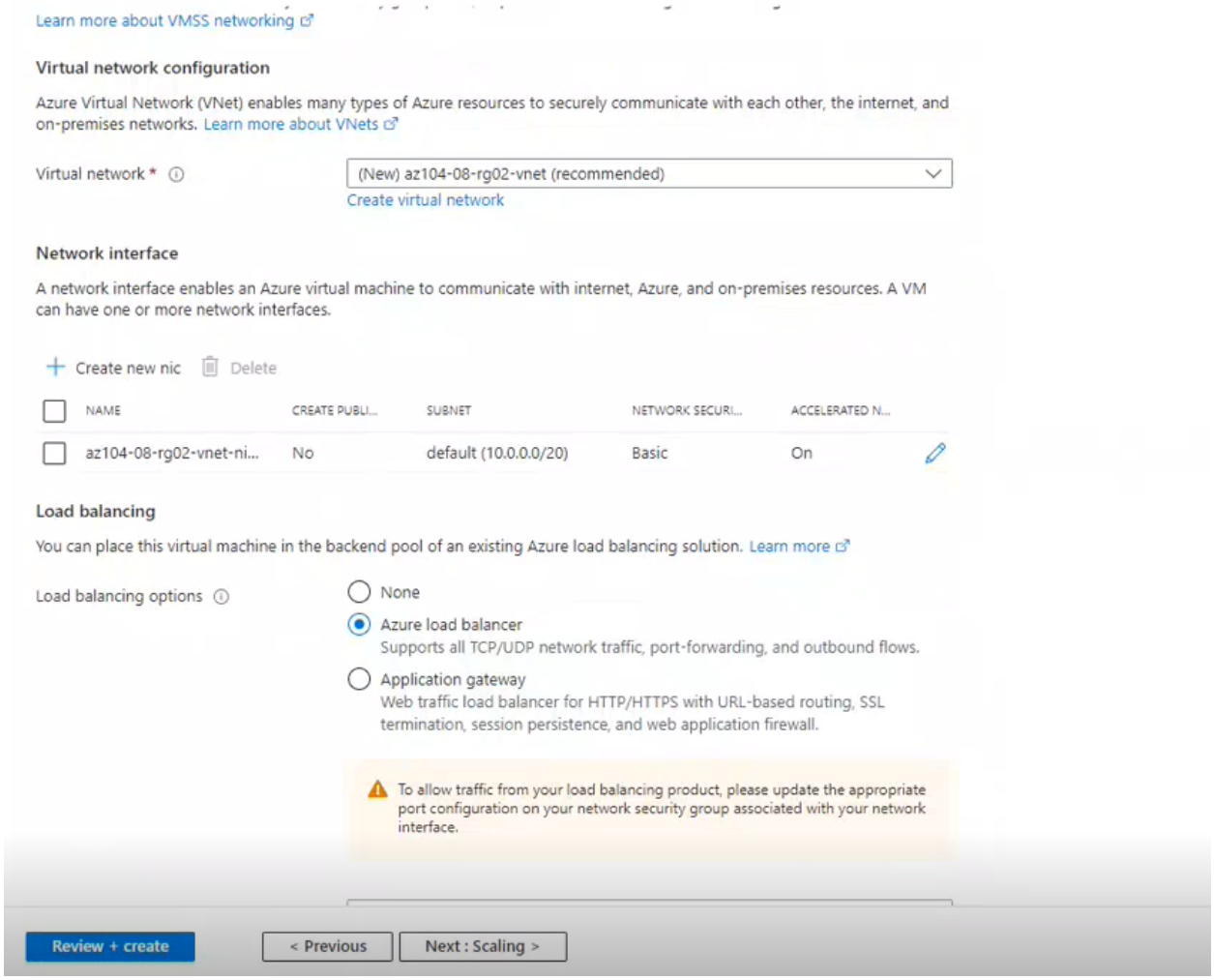
```
PS /home/andrijana> Register-AzResourceProvider -ProviderNamespace Microsoft.AlertsManagement

ProviderNamespace : Microsoft.AlertsManagement
RegistrationState : Registered
ResourceTypes     : {alerts, alertsSummary, smartGroups, smartDetectorAlertRules…}
Locations         : {global, North Central US, East US, East US 2…}


PS /home/andrijana>
PS /home/andrijana>
```

Task 5: *Deploy zone-resilient Azure virtual machine scale sets by using the Azure portal*

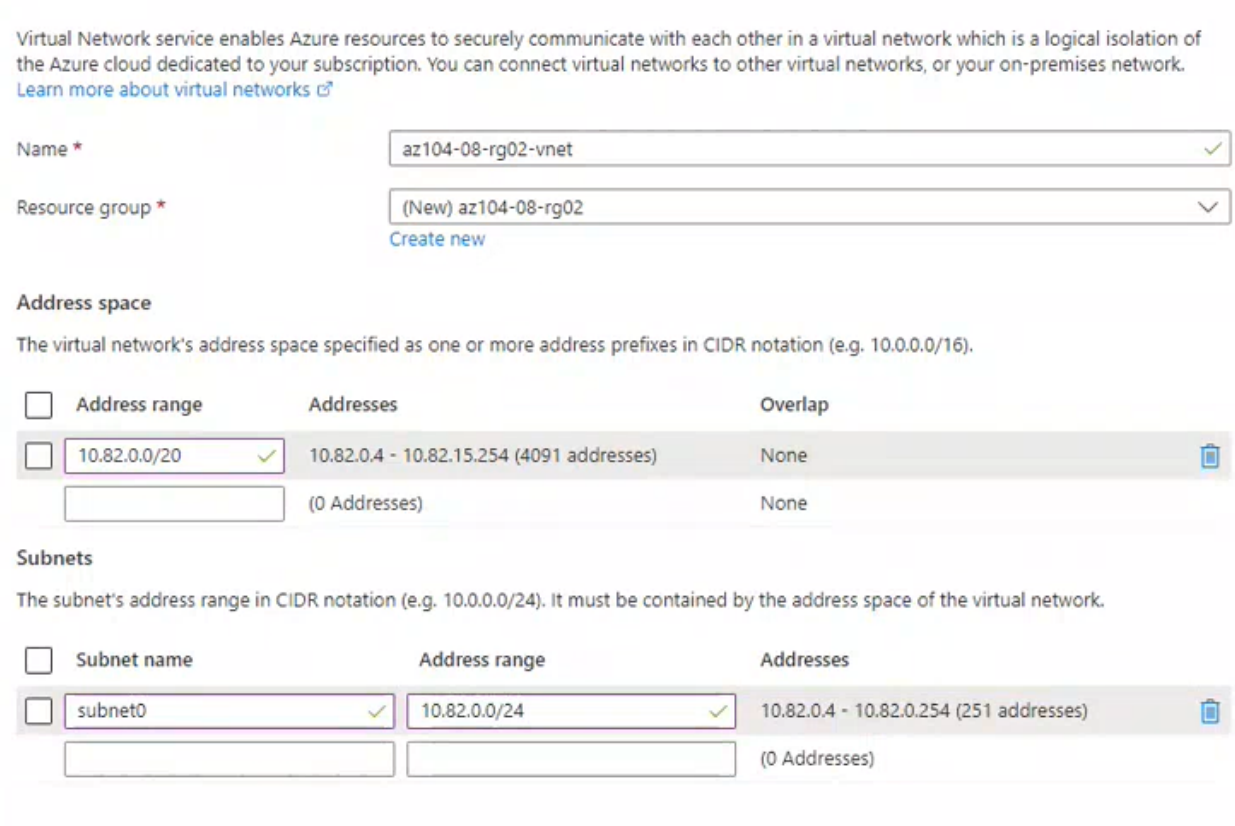




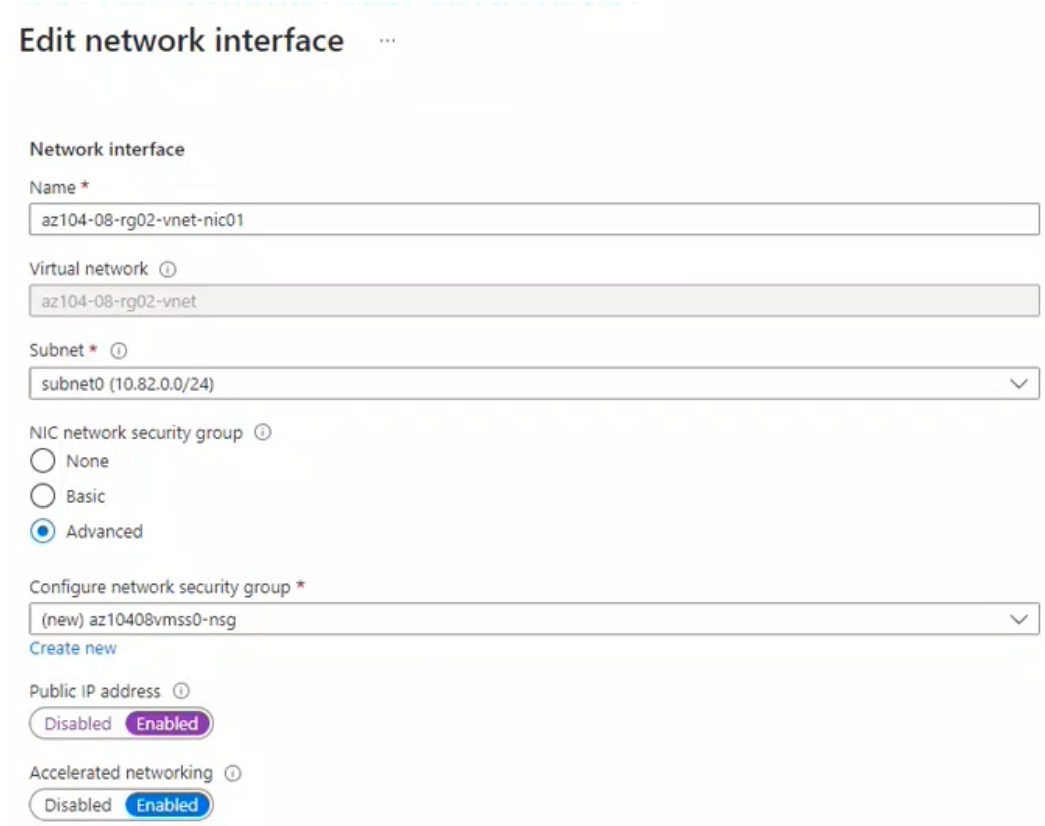
*On the Networking tab of the Create a virtual machine scale set blade, click the **Create virtual network** link below the Virtual network textbox and create a new virtual network with the following settings (leave others with their default values):*


Learn more about VMSS networking
Virtual network configuration
Azure Virtual Network (VNet) enables many types of Azure resources to securely communicate with each other, the internet, and on-premises networks. Learn more about VNets
Virtual network *
(New) az104-08-rg02-vnet (recommended)
Create virtual network
Network interface
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.
Create new nic
Delete
NAME
CREATE PUBLI...
SUBNET
NETWORK SECURI...
ACCELERATED N...
az104-08-rg02-vnet-ni...
No
default (10.0.0.0/20)
Basic
On
Load balancing
You can place this virtual machine in the backend pool of an existing Azure load balancing solution. Learn more
Load balancing options
None
Azure load balancer
Supports all TCP/UDP network traffic, port-forwarding, and outbound flows.
Application gateway
Web traffic load balancer for HTTP/HTTPS with URL-based routing, SSL termination, session persistence, and web application firewall.
To allow traffic from your load balancing product, please update the appropriate port configuration on your network security group associated with your network interface.
Review + create
< Previous
Next : Scaling >

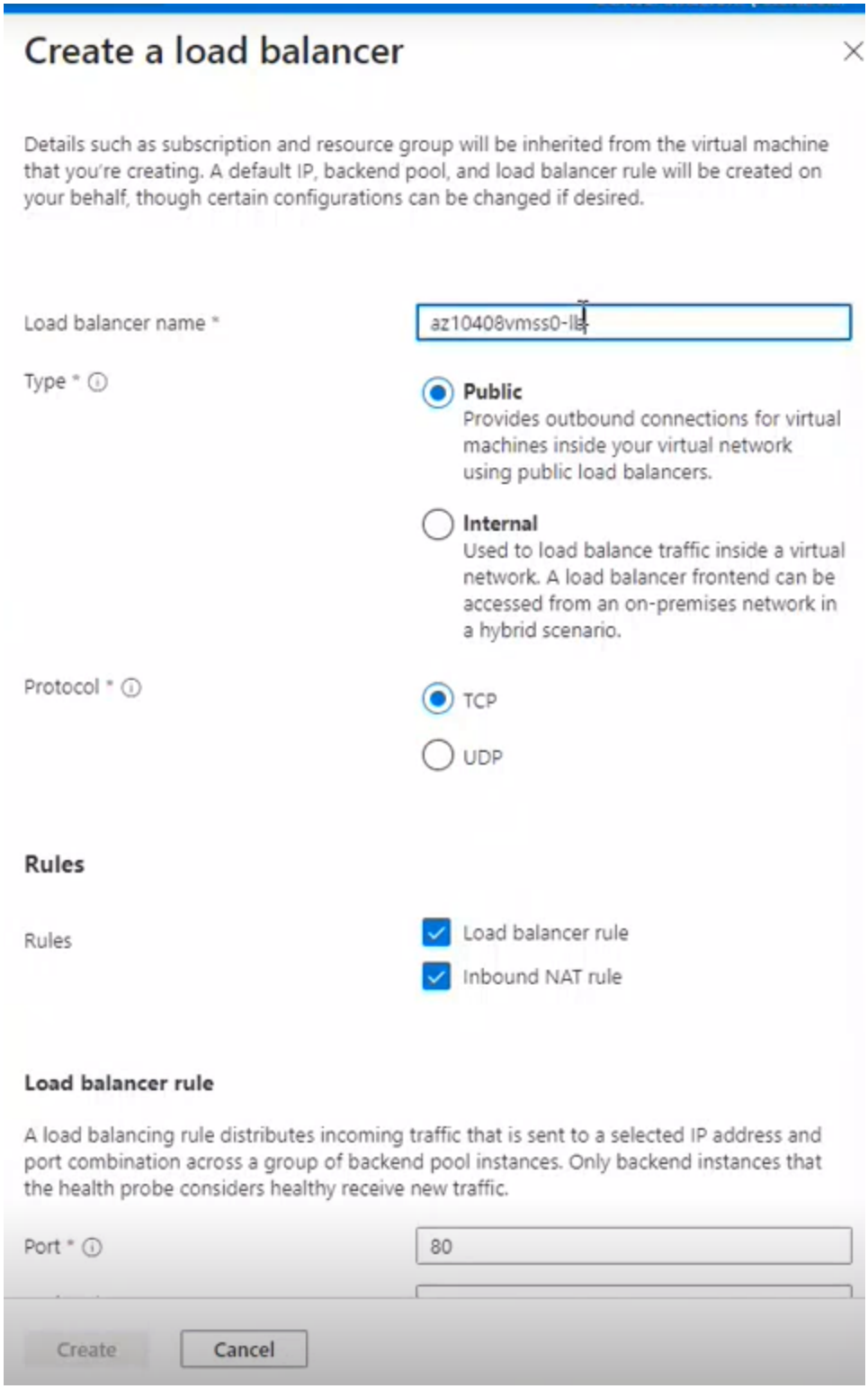
*Click **Add an inbound rule** and add an inbound security rule with the following settings (leave others with their default values):*

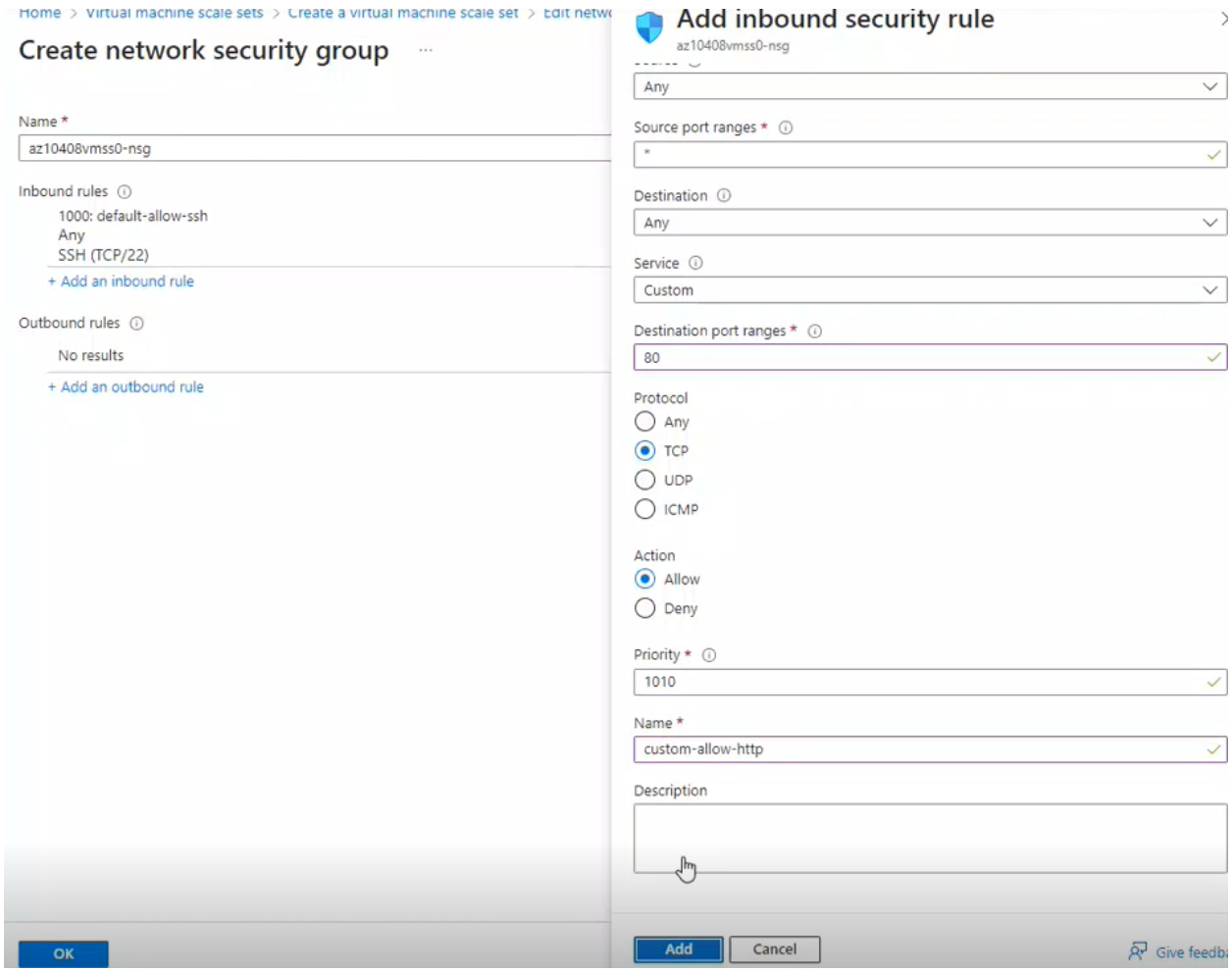


We Enable the Public IP Address in the Network Interface Settings

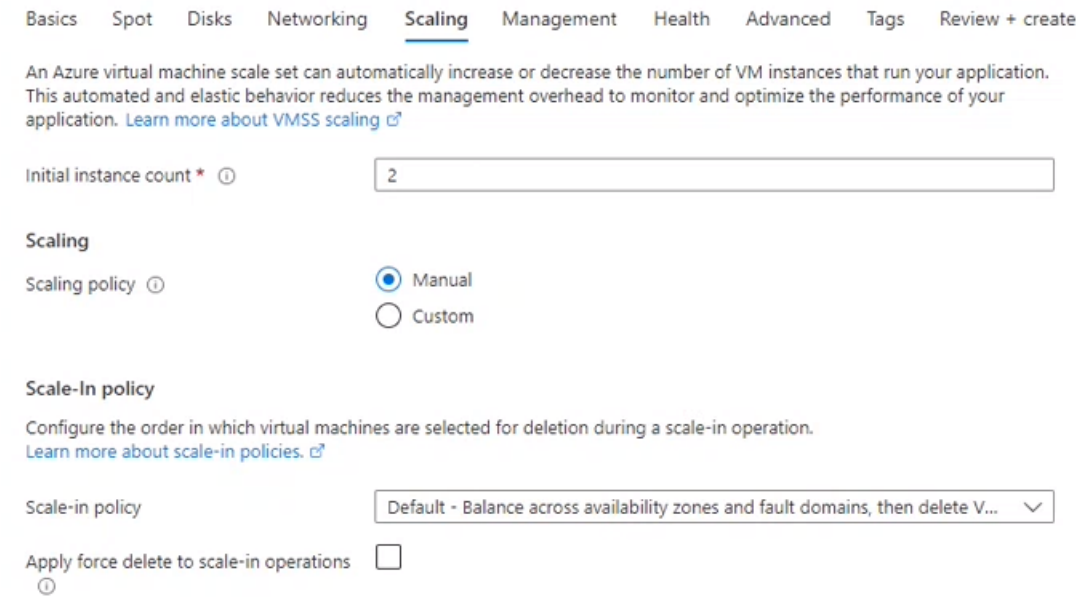


Here, I had to create a Load Balancer because a default option was not showing in the dropdown menu


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 *
az10408vmss0-lb
Type *
Public
Provides outbound connections for virtual machines inside your virtual network using public load balancers.
Internal
Used to load balance traffic inside a virtual network. A load balancer frontend can be accessed from an on-premises network in a hybrid scenario.
Protocol *
TCP
UDP
Rules
Rules
Load balancer rule
Inbound NAT rule
Load balancer rule
A load balancing rule distributes incoming traffic that is sent to a selected IP address and port combination across a group of backend pool instances. Only backend instances that the health probe considers healthy receive new traffic.
Port *
80
Create
Cancel

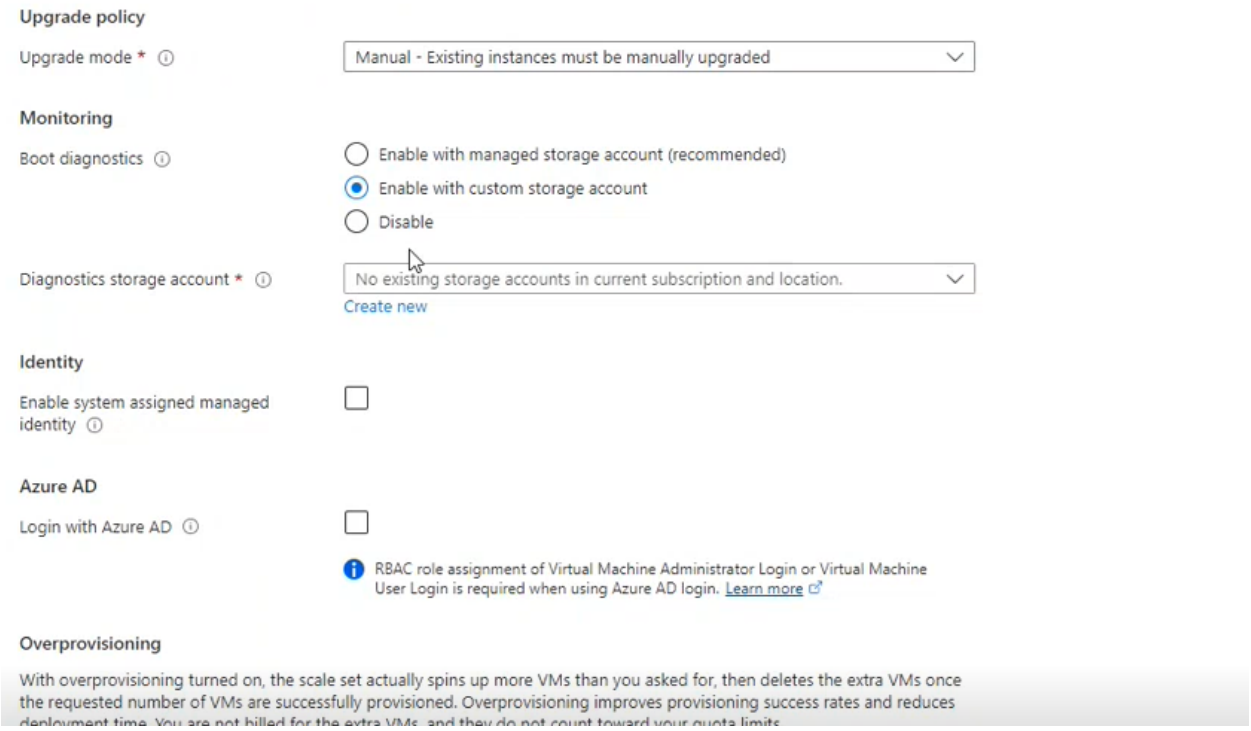


On the Scaling tab of the Create a virtual machine scale set blade, specify the following settings (leave others with their default values) and click Next : Management >:

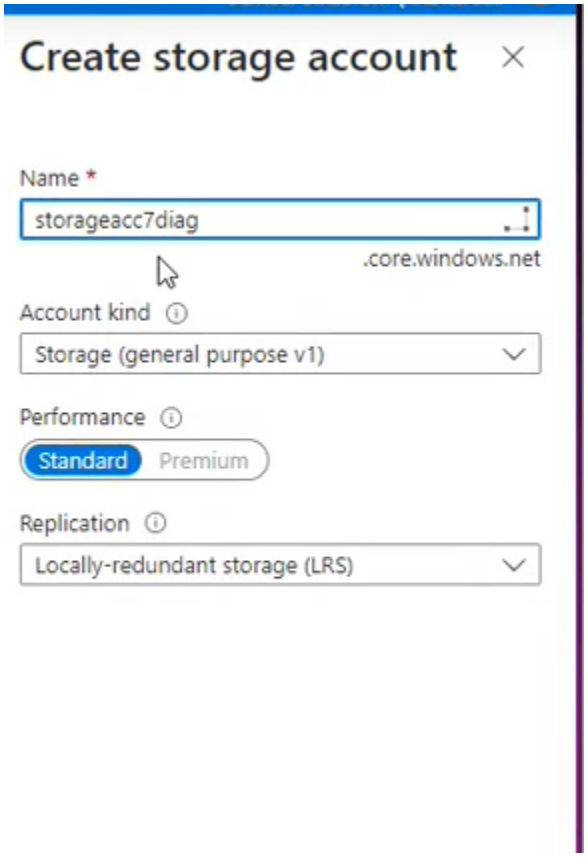


*Set the Initial instance count to **2**, and the Scaling policy to **Manual**.*

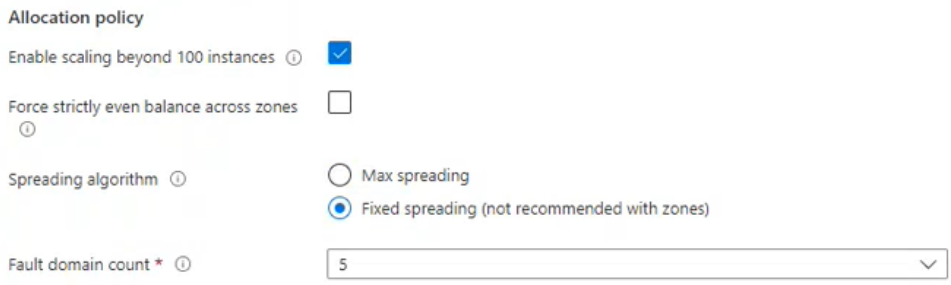
*On the Management tab, we set the Boot diagnostics to **Enable with custom storage account** and accept the default value for the Diagnostics storage account.*

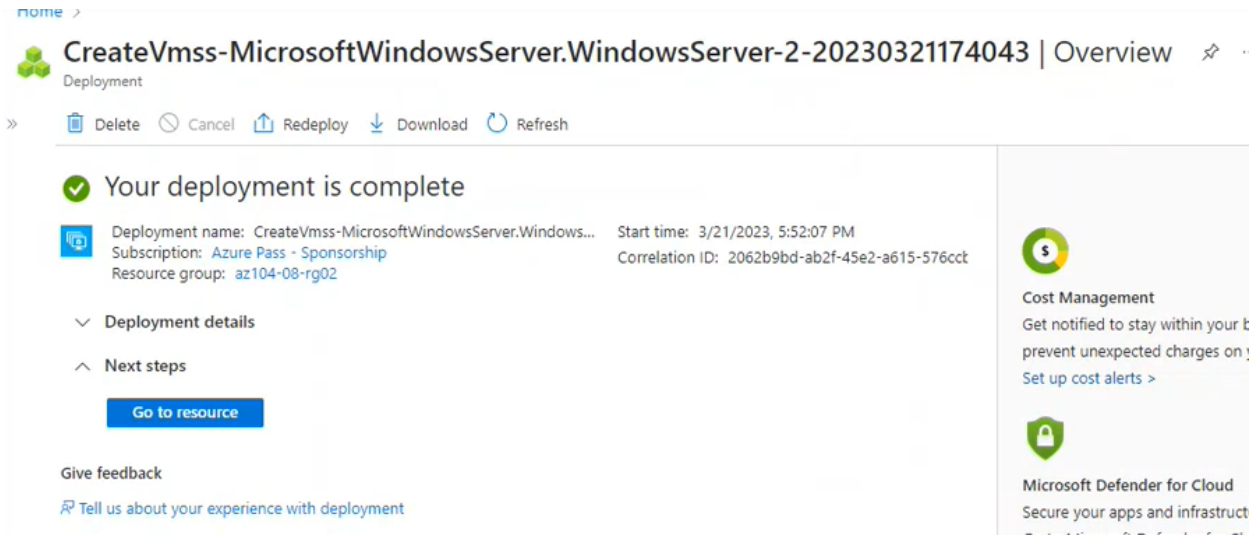


In this case, I had to create another diagnostics storage account because a default value wasn't showing in the menu.



*Set the **Spreading algorithm** setting to **Fixed spreading** in the **Advanced tab***

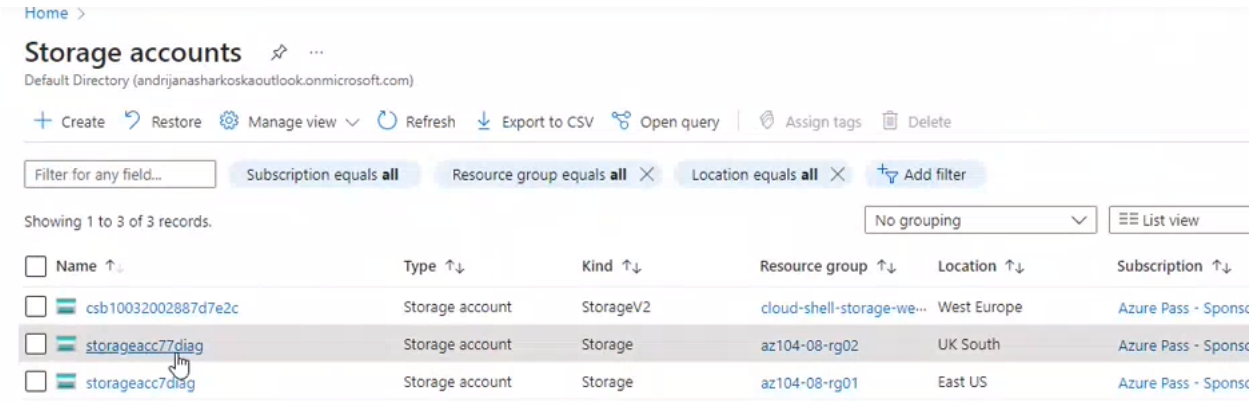




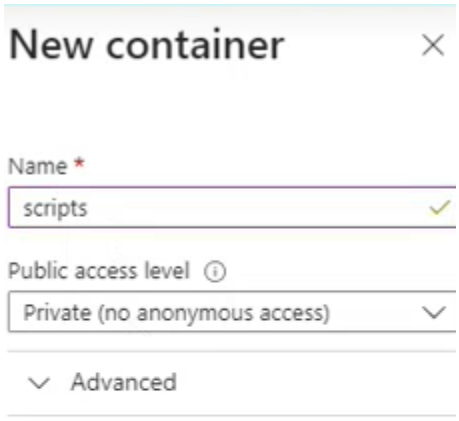
The deployment is successful.

Task 6: *Configure Azure virtual machine scale sets by using virtual machine extensions*

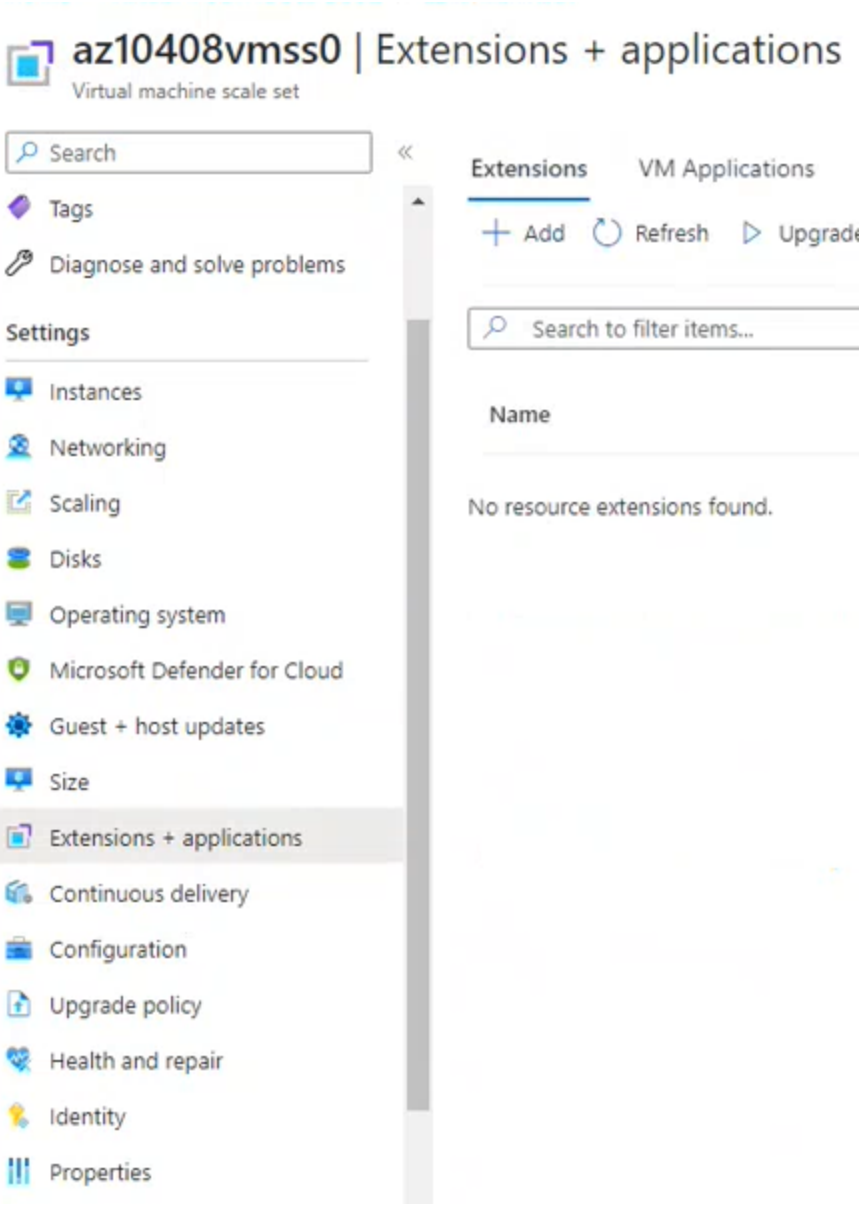
We select the storage account we've created previously, and in the Data Storage section, we create a new Container.

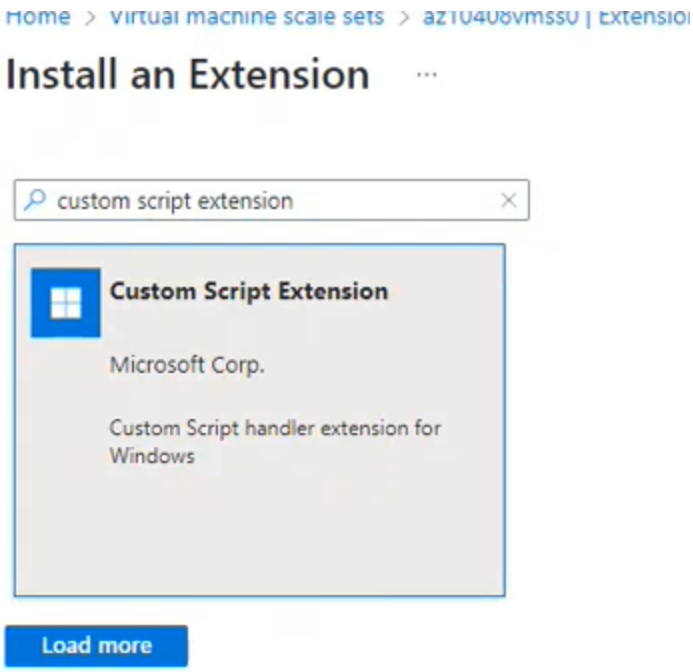


We set up the name of the container as scripts, and upload the az104-08-install_IIS.ps1 file.



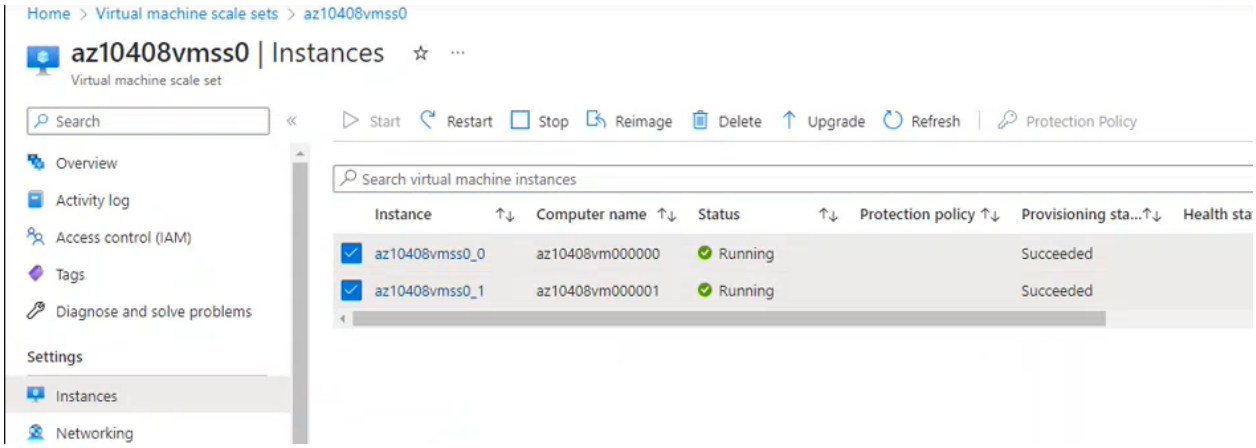
On the az10408vmss0 blade, in the Settings section, click Extensions and applications, and the click + Add


az10408vmss0 | Extensions + applications
Virtual machine scale set
Search
Tags
Diagnose and solve problems
Settings
Instances
Networking
Scaling
Disks
Operating system
Microsoft Defender for Cloud
Guest + host updates
Size
Extensions + applications
Continuous delivery
Configuration
Upgrade policy
Health and repair
Identity
Properties
Extensions
VM Applications
Add
Refresh
Upgrade
Search to filter items...
Name
No resource extensions found.

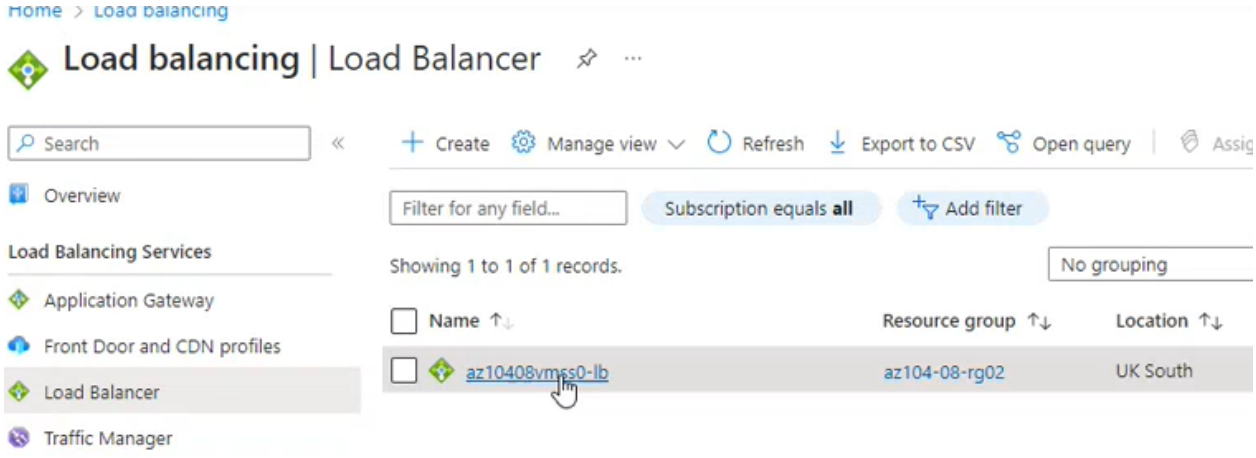


Once the custom script extension is loaded, we click Next.

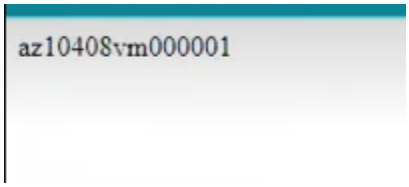
*In the Settings section of the az10408vmss0 blade, click **Instances**, select the checkboxes next to the two instances of the virtual machine scale set, click **Upgrade**, and then, when prompted for confirmation, click **Yes**.*



In the Azure portal, search for and select Load balancers and, in the list of load balancers, click az10408vmss0-lb.



On the az10408vmss0-lb blade, note the value of the Public IP address assigned to the frontend of the load balancer, open a new browser tab, and navigate to that IP address.

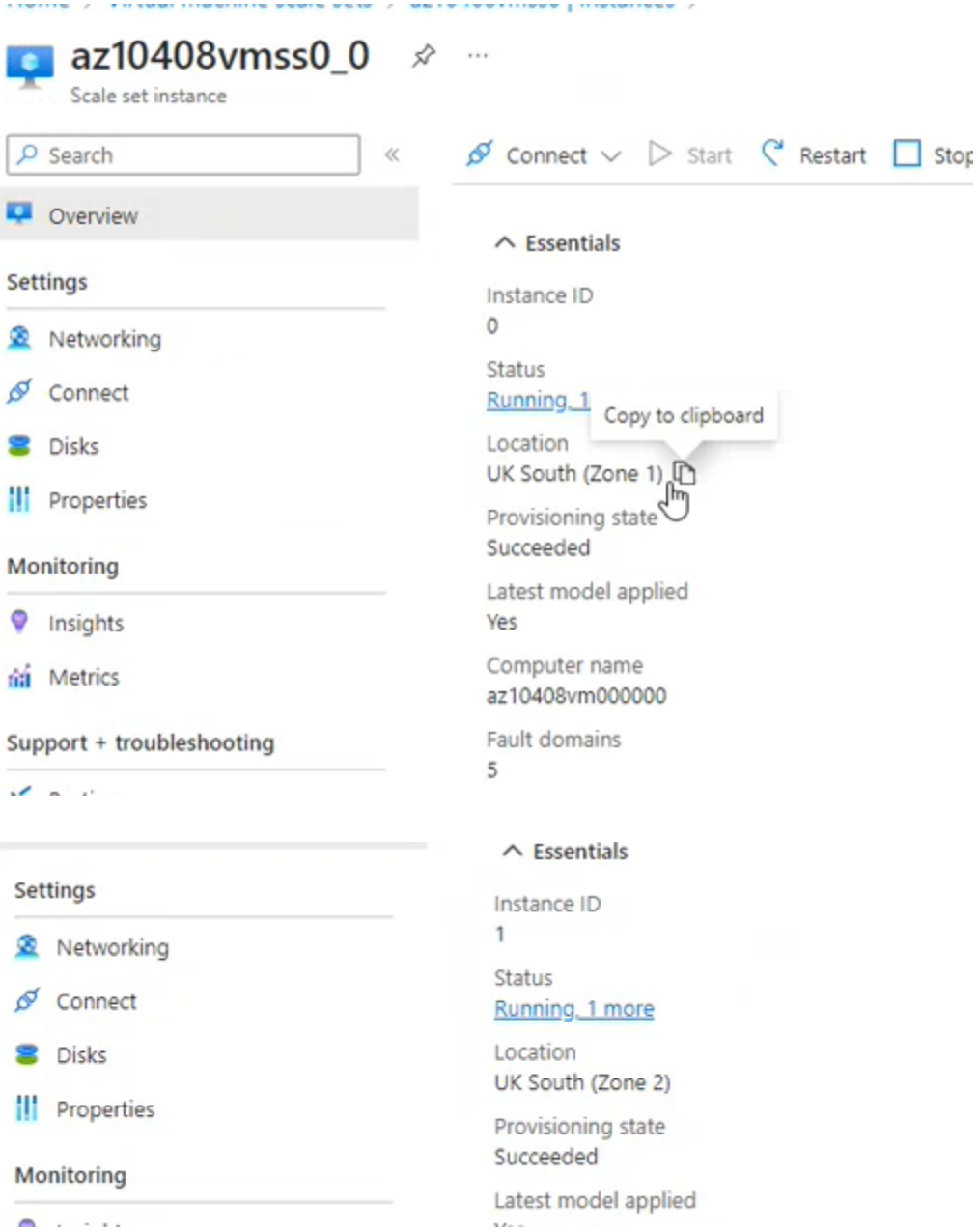


Task 7: *Scale compute and storage for Azure virtual machine scale sets (optional)*

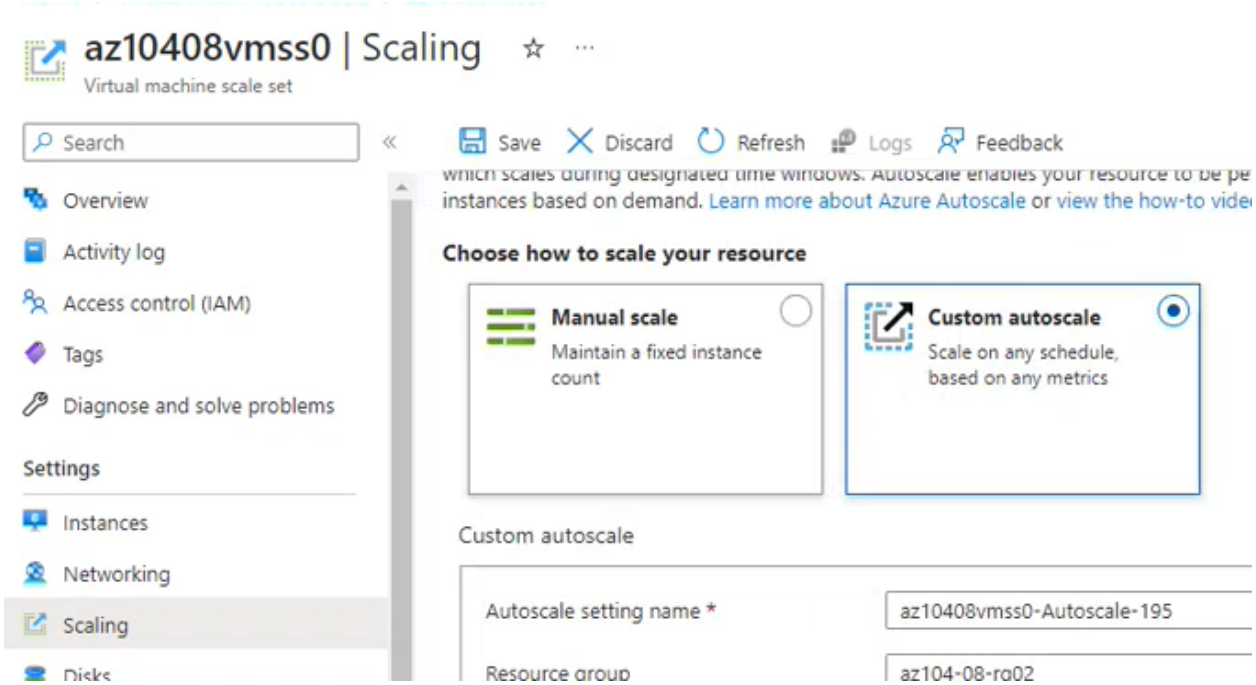
We navigate to the **az10408vmss0** blade and resize the **Standard DS1_v2**.

In the Settings section, click Instances, select the checkboxes next to the two instances of the virtual machine scale set, click Upgrade, and then, when prompted for confirmation, click Yes.

Return to the **az10408vmss0** - **Instances** blade, click the entry representing the first and second instances and, on the scale set instance blade, note its **Location** (it should be one of the other two zones in the target Azure region into which you deployed the Azure virtual machine scale set)


az10408vmss0_0
Scale set instance
Search
Connect
Start
Restart
Stop
Overview
Settings
Networking
Connect
Disks
Properties
Monitoring
Insights
Metrics
Support + troubleshooting
Essentials
Instance ID
0
Status
Running, 1
Copy to clipboard
Location
UK South (Zone 1)
Provisioning state
Succeeded
Latest model applied
Yes
Computer name
az10408vm000000
Fault domains
5
Settings
Networking
Connect
Disks
Properties
Monitoring
Essentials
Instance ID
1
Status
Running, 1 more
Location
UK South (Zone 2)
Provisioning state
Succeeded
Latest model applied

On the az10408vmss0 - **Scaling** blade, select the **Custom autoscale** option and configure autoscale with the following settings (leave others with their default values)



Click the + Add a rule link and, on the Scale rule blade, specify the following settings (leave others with their default values):

Setting	Value
Metric source	Current resource (az10480vmss0)
Time aggregation	Average
Metric namespace	Virtual Machine Host

Metric name	Network In Total
Operator	Greater than
Metric threshold to trigger scale action	10
Duration (in minutes)	1
Time grain statistic	Average
Operation	Increase count by
Instance count	1
Cool down (minutes)	5

Scale rule

Metric source

Current resource (az10408vmss0)

Resource type

Virtual machine scale sets

Resource

az10408vmss0

Criteria

Metric namespace *

Virtual Machine Host

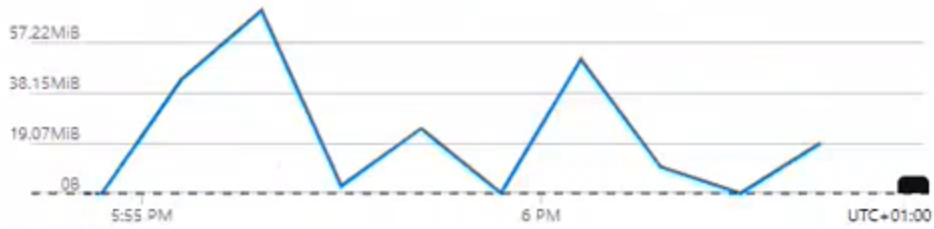
Metric name

Network In Total

1 minute time grain

Dimension Name	Operator	Dimension Values	Add
VMName	=	All values	+

f you select multiple values for a dimension, autoscale will aggregate the metric across the selected values, not evaluate the metric for each values individually.



Network In Total (Average)

21.99 MB

Enable metric divide by instance count

Operator *

Greater than

Metric threshold to trigger scale action *

70

bytes

Duration (minutes) *

10

Time grain (minutes)

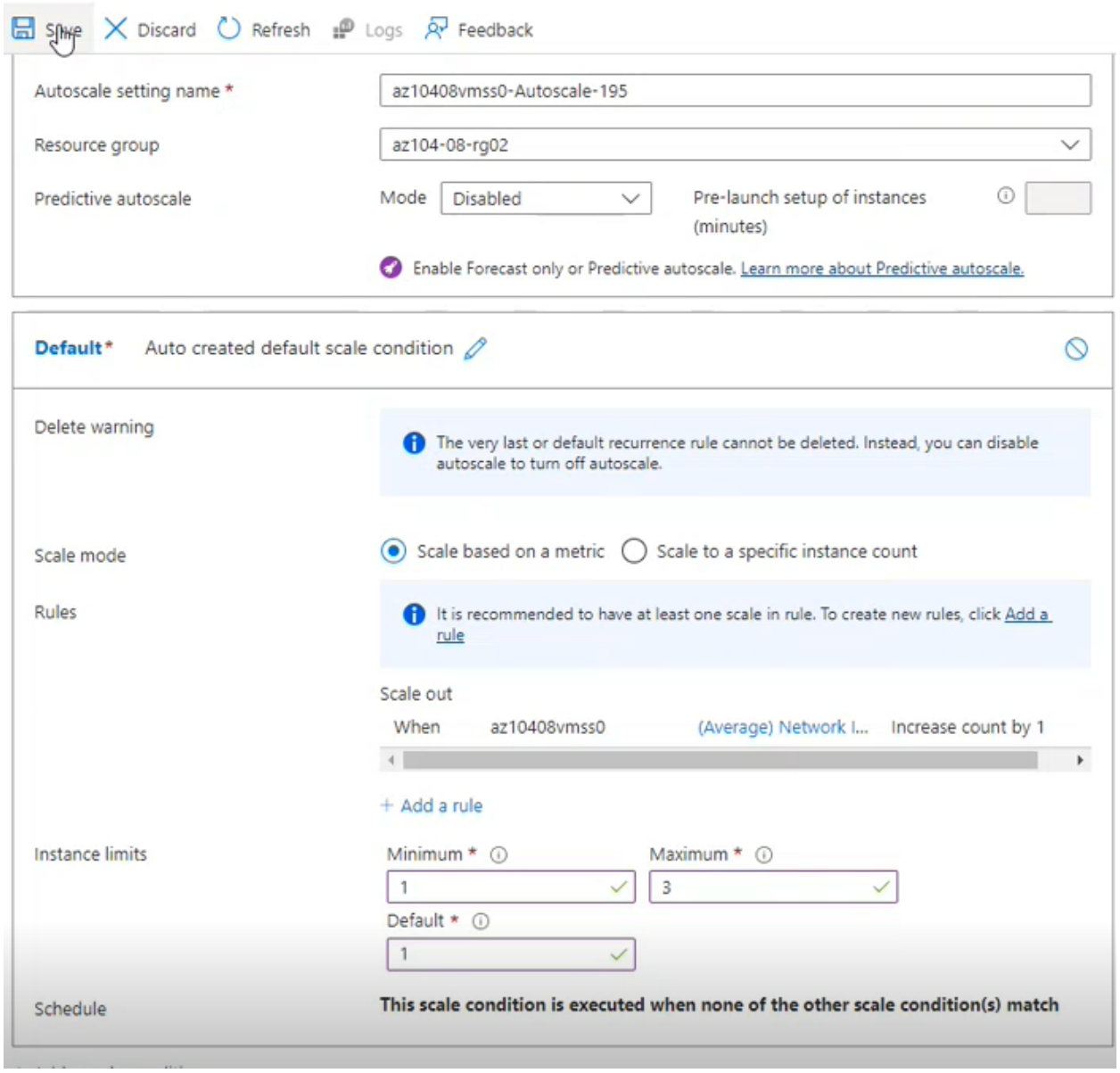
1

Time grain statistic *

Average

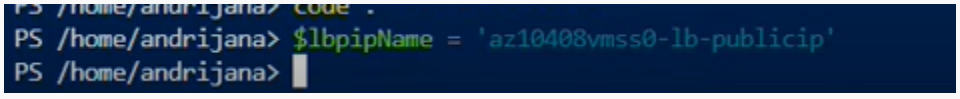
Time aggregation *

Average



From the **Cloud Shell pane**, run the following to identify the public IP address of the load balancer in front of the Azure virtual machine scale set az10408vmss0.

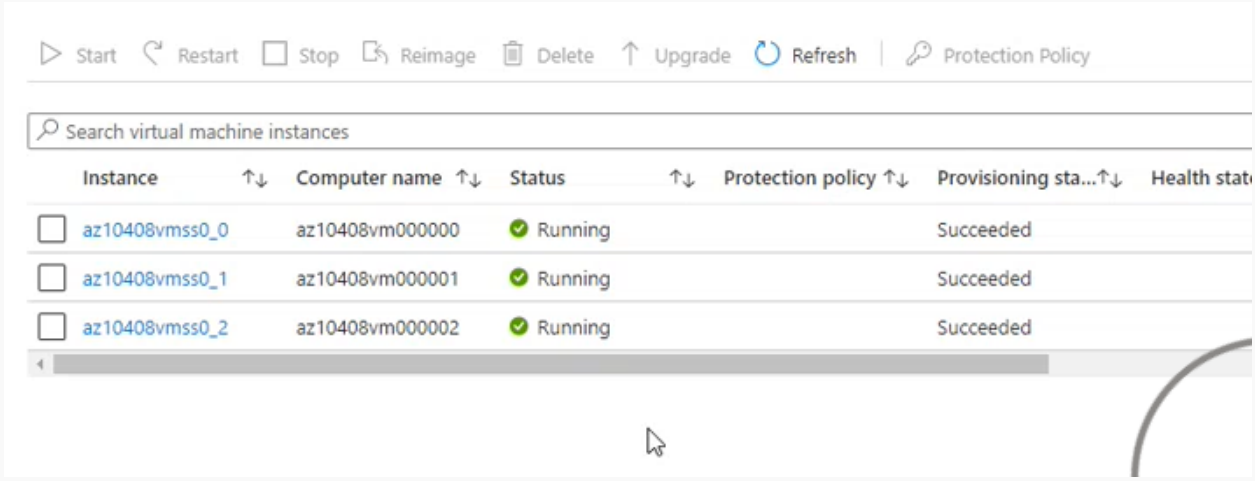
```
$rgName = 'az104-08-rg02'

$lbpipName = 'az10408vmss0-ip'

$pip = (Get-AzPublicIpAddress -ResourceGroupName $rgName -Name $lbpipName).IpAddress
```



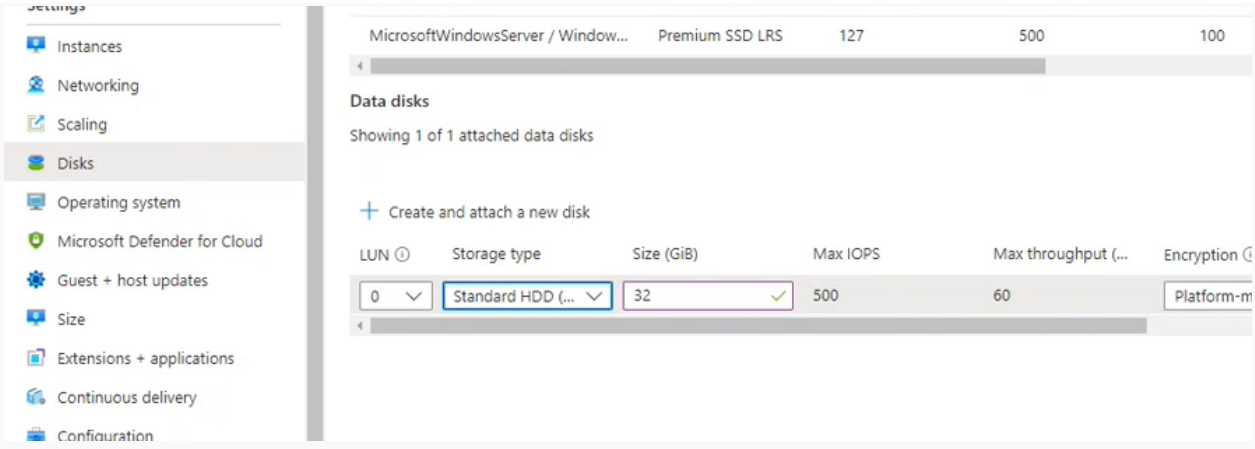
```
while ($true) { Invoke-WebRequest -Uri "http://$pip" }
```

```
StatusDescription : OK
Content           : az10408vm000002

RawContent        : HTTP/1.1 200 OK
                    Accept-Ranges: bytes
                    ETag: "641e29f3175cd91:0"
                    Server: Microsoft-IIS/10.0
                    Date: Tue, 21 Mar 2023 17:11:01 GMT
                    Content-Type: text/html
                    Last-Modified: Tue, 21 Mar 2023 17:09:51 GMT
                    Conte…
Headers           : {[Accept-Ranges, System.String[]], [ETag, System.String[]], [Server, System.String[]], [Date, System.String[]]…}
Images            : {}
InputFields       : {}
Links             : {}
RawContentLength  : 17
RelationLink      : {}
```

Minimize the Cloud Shell pane but do not close it, switch back to the az10408vmss0 - Instances blade and monitor the number of instances



On the az10408vmss0 blade, in the **Settings** section, click **Disks**, click **+ Create and attach a new disk**, and attach a new managed disk with the following settings (leave others with their default values)



From the Cloud Shell pane, run the following to display the content of the script:

```
Set-Location -Path $HOME
```

```
Get-Content -Path ./az104-08-configure_VMSS_disks.ps1
```