



# Compte rendu TP3

## Load Balancers

RT4 \_ Groupe 1



### - Réalisé par :

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## Task 1

### Standard Load Balancer :

1-

The screenshot shows the 'Create virtual network' wizard in the Microsoft Azure portal. The 'Basics' tab is selected. In the 'Subscription' dropdown, 'Azure for Students' is chosen. Under 'Resource group', '(New) tp3rglb' is selected. The 'Virtual network name' is set to 'vnet1'. The 'Region' is set to '(Europe) North Europe'. At the bottom, there are 'Previous', 'Next', and 'Review + create' buttons.

2-

The screenshot shows the 'Create a virtual machine' wizard in the Microsoft Azure portal. The 'Subscription' dropdown shows 'Azure for Students'. Under 'Resource group', '(New) tp3rg' is selected. The 'Virtual machine name' is 'loadvm1'. The 'Region' is '(Europe) North Europe'. Under 'Availability options', 'Availability zone' is selected, and 'Zones 1' is chosen. A note states: 'You can now select multiple zones. Selecting multiple zones will create one VM per zone.' Below this, 'Security type' is set to 'Trusted launch virtual machines' and 'Image' is 'Windows Server 2019 Datacenter - x64 Gen2'. At the bottom, there are 'Review + create', '< Previous', and 'Next : Disks >' buttons.

Microsoft Azure | portal.azure.com

Home > Virtual machines > Create a virtual machine

x64  
⚠️ Arm64 is not supported with the selected image.

Run with Azure Spot discount

Size \*

**Administrator account**

Username \*  ✓

Password \*  ✓

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

[Review + create](#) [< Previous](#) [Next : Disks >](#) [Give feedback](#)

**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 \*

⚠️ 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.

[Review + create](#) [< Previous](#) [Next : Disks >](#) [Give feedback](#)

Microsoft Azure | portal.azure.com

Home > Virtual machines > Create a virtual machine

**Network interface**

When creating a virtual machine, a network interface will be created for you.

Virtual network \* ⓘ vnet1  
Create new

Subnet \* ⓘ default (10.0.0.0/24)  
Manage subnet configuration

Public IP \* ⓘ (new) loadvm1-ip  
Create new

NIC network security group ⓘ  
 None  
 Basic  
 Advanced

Public inbound ports \* ⓘ  
 None  
 Allow selected ports

Select inbound ports \* ⓘ HTTP (80), RDP (3389)

**Review + create** < Previous Next : Management >

https://portal.azure.com/?Microsoft\_Azure\_Education\_correlationId=26d4284c8bd849fd998b5295c250348&Microsoft\_Azure\_Education\_newA4E=true&Microsoft\_Azure\_Education\_asoSubGuid=a5030eba-08e4-4093-ab86-fa81b9f...

Microsoft Azure | portal.azure.com

Home > CreateVm-MicrosoftWindowsServer.WindowsServer-201-20230323120327 | Overview

**Deployment**

Search < Delete Cancel Redeploy Download Refresh

**Overview** Your deployment is complete

Deployment name: CreateVm-MicrosoftWindowsServer.Windows... Start time: 3/23/2023, 12:09:22 PM  
Subscription: Azure for Students Correlation ID: a0d0845b-eb19-4aef-9918-1.  
Resource group: tp3rg

Deployment details

Next steps

Setup auto-shutdown Recommended  
Monitor VM health, performance and network dependencies Recommended  
Run a script inside the virtual machine Recommended

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

Give feedback  
Tell us about your experience with deployment

3-

**Create a virtual machine**

⚠️ Changing Basic options may reset selections you have made. Review all options prior to creating the virtual machine.

**Instance details**

Virtual machine name \*  ✓

Region \*  ▼

Availability options  ▼

Availability zone \*  ▼

You can now select multiple zones. Selecting multiple zones will create one VM per zone. [Learn more](#)

Security type  ▼

Configure security features

Image \*  ▼

[See all images](#) | [Configure VM generation](#)

VM architecture  Arm64  x64

**Review + create** < Previous Next : Disks > Give feedback

**Create a virtual machine**

Image \*  ▼

[See all images](#) | [Configure VM generation](#)

VM architecture  Arm64  x64

Arm64 is not supported with the selected image.

Run with Azure Spot discount

Size \*  ▼

[See all sizes](#)

**Administrator account**

Username \*  ✓

Password \*  ✓

Confirm password \*  ✓

**Inbound port rules**

**Review + create** < Previous Next : Disks > Give feedback

[https://portal.azure.com/?Microsoft\\_Azure\\_Education\\_correlationId=26d4284c8bd849fda998b5295c250348&Microsoft\\_Azure\\_Education\\_newA4E=true&Microsoft\\_Azure\\_Education\\_asoSubGuid=85030eba-08e4-4093-ab86-fa81b9f...](https://portal.azure.com/?Microsoft_Azure_Education_correlationId=26d4284c8bd849fda998b5295c250348&Microsoft_Azure_Education_newA4E=true&Microsoft_Azure_Education_asoSubGuid=85030eba-08e4-4093-ab86-fa81b9f...)

Home > Create a virtual machine ...

Username \* ⓘ mouhib ✓

Password \* ⓘ ..... ✓

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 \*

HTTP (80), 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.

**Review + create**

< Previous Next : Disks >

Give feedback

Home > Create a virtual machine ...

Learn more ⓘ

Network interface

When creating a virtual machine, a network interface will be created for you.

Virtual network \* ⓘ vnet1

Create new

Subnet \* ⓘ default (10.0.0.0/24)

Manage subnet configuration

Public IP ⓘ (new) loadvm2-ip

Create new

NIC network security group ⓘ

None

Basic

Advanced

Public inbound ports \* ⓘ

None

Allow selected ports

Select inbound ports \*

HTTP (80), RDP (3389) ▾

**Review + create**

< Previous Next : Management >

Give feedback

Microsoft Azure | portal.azure.com

# CreateVm-MicrosoftWindowsServer.WindowsServer-201-20230323121355 | Overview

Your deployment is complete

Deployment name: CreateVm-MicrosoftWindowsServer.WindowsServer-201-20230323121355 Start time: 3/23/2023, 12:17:49 PM  
Subscription: Azure for Students Correlation ID: 57e3ba39-0788-4003-8ee4-e...

Inputs Outputs Template

Deployment details Next steps

Setup auto-shutdown Recommended Monitor VM health, performance and network dependencies Recommended Run a script inside the virtual machine Recommended

Go to resource Create another VM

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 >

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4-

Microsoft Azure | portal.azure.com

# Create storage account

Name \* tp3

Account kind \* Storage (general purpose v1)

Performance \* Standard Premium

Replication \* Locally-redundant storage (LRS)

Location \* (Europe) North Europe

Resource group \* tp3rg Create new

Minimum TLS version \* Version 1.2

OK

install\_IIS - Bloc-notes

Fichier Edition Format Affichage Aide

```
powershell.exe Install-WindowsFeature -name Web-Server -IncludeManagementTools
powershell.exe Remove-Item -Path 'C:\inetpub\wwwroot\iisstart.htm'
powershell.exe Add-Content -Path 'C:\inetpub\wwwroot\iisstart.htm' -Value "$env:computername"
```

Microsoft Azure | portal.azure.com

Home > loadvm1 | Extensions + applications > Install an Extension > Configure Custom Script Extension Extension >

**tp3** ...  
Container

Upload Refresh Give feedback

Authentication method: Access key (Switch to Azure AD User Account)  
Location: tp3

Search blobs by prefix (case-sensitive)

Add filter

Name	Modified	Access tier
install_IIS.ps1	3/23/2023, 12:35:09 PM	A

Select

Upload blob

Successfully uploaded blob(s)  
Successfully uploaded 1 blob(s).

Drag and drop files here  
or  
Browse for files

Overwrite if files already exist

Advanced

Upload Give feedback

Current uploads

install\_IIS.ps1 240 B / 240 B

Dismiss: Completed All

Microsoft Azure | portal.azure.com

Home > loadvm1 | Extensions + applications > Install an Extension >

## Configure Custom Script Extension Extension

Create Review + create

Script file (Required) \*

Arguments (Optional)

Review + create < Previous Next : Review + create > Give feedback

The screenshot shows two main windows from the Microsoft Azure portal. The top window is titled 'Upload blob' and displays a successful upload of a file named 'install\_IIS.ps1'. It includes options for dragging and dropping files or browsing for them, and a checkbox for overwriting existing files. The bottom window is titled 'Configure Custom Script Extension Extension' and is in the 'Create' step. It shows the selected script file as 'install\_IIS.ps1' and an empty arguments field. Navigation buttons at the bottom include 'Review + create', '< Previous', 'Next : Review + create >', and 'Give feedback'.

Microsoft Azure Search resources, services, and docs (G+/-) 4

Home > Microsoft.CustomScriptExtension-20230323143020 | Overview ...

Deployment

Search Delete Cancel Redeploy Download Refresh

Overview Inputs Outputs Template

✓ Your deployment is complete

Deployment name: Microsoft.CustomScriptExtension-20... Start time: 3/23/2023, 2:32:16 PM  
Subscription: Azure for Students Correlation ID: ddf74e46-cd18-49ea-9900-61a787c1  
Resource group: tp3rg

Deployment details Next steps

Go to resource

**Cost Management**  
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[Set up cost alerts >](#)

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9

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Microsoft Azure

Search resources, services, and docs (G+/)

Home > Recent > tp3rg > loadvm2 | Extensions + applications > Install an Extension >

## Configure Custom Script Extension Extension

Create Review + create

Script file (Required) \*  ✓ Browse

Arguments (Optional)

Review + create < Previous Next : Review + create >

Microsoft Azure

Search resources, services, and docs (G+/)

Home >

## Microsoft.CustomScriptExtension-20230323143443 | Overview

Deployment

Search Delete Cancel Redeploy Download Refresh

Overview Inputs Outputs Template

>Your deployment is complete

Deployment name: Microsoft.CustomScriptExtension-20230323143443 Start time: 3/23/2023, 2:35:18 PM  
Subscription: Azure for Students Correlation ID: 0ea27614-e4e0-4411-b702-6c7935a7  
Resource group: TP3RG

Deployment details Next steps

Go to resource

**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  
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[https://portal.azure.com/?Microsoft\\_Azure\\_Education\\_correlationId=26d4284c8bd849fd998b5295c250348&Microsoft\\_Azure\\_Education\\_newA4E=true&Microsoft\\_Azure\\_Education\\_asoSubGuid=85030eba-08e4-4093-ab86-fa81b9f...](https://portal.azure.com/?Microsoft_Azure_Education_correlationId=26d4284c8bd849fd998b5295c250348&Microsoft_Azure_Education_newA4E=true&Microsoft_Azure_Education_asoSubGuid=85030eba-08e4-4093-ab86-fa81b9f...)

6-

**Create load balancer**

Subscription \* Azure for Students

Resource group \* tp3rg

Name \* standloadbalancer

Region \* North Europe

SKU \* Standard

Type \* Public

Tier \* Regional

Microsoft recommends Standard SKU load balancer for production workloads. [Learn more about pricing differences between Standard and Basic SKU](#)

Review + create < Previous Next : Frontend IP configuration > Download a template for automation Give feedback

**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 NAT.

+ 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

**Add frontend IP configuration**

Name \* loadfrontenedip

IP version IPv4

IP type IP address

Public IP address \* (New) loadfrontenedip

Gateway Load balancer None

Add

Microsoft Azure | portal.azure.com

Home > Load balancing | Load Balancer > Create load balancer >

## Add backend pool

Name \*

Virtual network

Backend Pool Configuration  NIC  IP address

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.

+ Add | Remove

	Resource Name	Resource group	Type	IP configuration	IP Address	Availability ...
<input type="checkbox"/>	loadvm1	TP3RG	Virtual machine	ipconfig1	10.0.0.4	
<input type="checkbox"/>	loadvm2	TP3RG	Virtual machine	ipconfig1	10.0.0.5	

**Save** | **Cancel** | [Give feedback](#)

Microsoft Azure | portal.azure.com

Home > Load balancing | Load Balancer >

## Create load balancer

Load balancing 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. The backend instances are eligible to receive traffic.

+ Add a load balancing rule

Name ↑↓	Frontend IP configuration ↑↓	Backend pool ↑↓	Health probe ↑↓	Frontend port ↑↓
Add a rule to get started				

Inbound NAT rule  
An inbound NAT rule forwards incoming traffic sent to a selected IP address and port combination to a specific virtual machine.

+ Add an inbound nat rule

Name ↑↓	Frontend IP configuration ↑↓	Service ↑↓	Target ↑↓
Add a rule to get started			

**Add load balancing rule**

Name \*

IP Version \*  IPv4  IPv6

Frontend IP address \*

Backend pool \*

Protocol \*  TCP  UDP

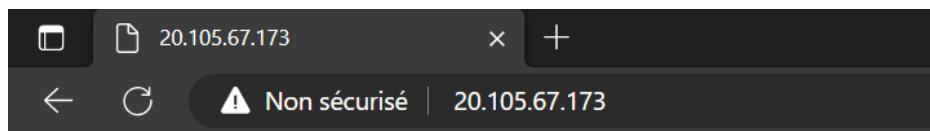
Port \*

Backend port \*

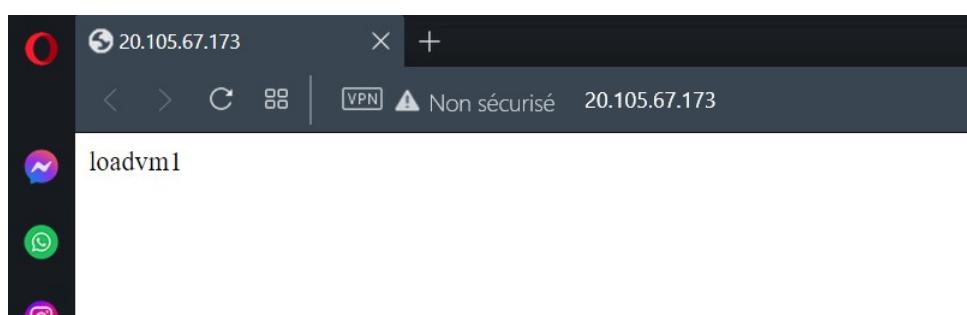
**Review + create** | **< Previous** | **Next : Outbound rule >** | [Download a template for automation](#) | [Give feedback](#) | **Add**

The screenshot shows the Microsoft Azure portal interface. At the top, the URL is portal.azure.com. The main title is "Microsoft.LoadBalancer-20230323143819 | Overview". On the left, there's a sidebar with icons for Home, Microsoft Load Balancer, Deployment, Overview, Inputs, Outputs, and Template. The "Overview" item is selected. Below the title, a message says "Your deployment is complete". It provides deployment details: Deployment name: Microsoft.LoadBalancer-2023032..., Start time: 3/23/2023, 2:45:26 PM, Subscription: Azure for Students, Correlation ID: db733b69-00b2-4b65-9897-dc0b225c75d, Resource group: tp3rg. There are sections for "Deployment details" and "Next steps", and a "Go to resource" button. At the bottom, there are links for "Give feedback" and "Tell us about your experience with deployment". On the right side, there are promotional cards for Cost Management, Microsoft Defender for Cloud, Free Microsoft tutorials, and Work with an expert.

7-



loadvm2



The screenshot shows the Microsoft Azure portal interface for creating an inbound NAT rule. The URL in the address bar is `portal.azure.com`. The page title is "Add inbound NAT rule". The navigation path is "Home > standloadbalancer | Inbound NAT rules > Add inbound NAT rule".

The form fields are as follows:

- Target virtual machine:** loadvm1 (ResourceGroup: TP3RG, AvailabilitySet: -)
- Network IP configuration \***: ipconfig1 (10.0.0.4)
- Frontend IP address \***: loadfrontenedip (20.105.67.173)
- Frontend Port \***: 49152
- Service Tag \***: Custom
- Backend port \***: 3389
- Protocol**:  TCP  UDP
- Enable TCP Reset**:
- Idle timeout (minutes)**: 4
- Enable Floating IP**:

At the bottom left, there is a "Validating..." status message and a "Give feedback" link.

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes icons for messaging, social media, and account management, along with the URL [portal.azure.com](https://portal.azure.com). The main content area has a blue header bar with the text "Microsoft Azure" and a search bar that says "Search resources, services, and docs (G+/-)". Below this, the breadcrumb navigation shows "Home > standloadbalancer | Inbound NAT rules > Add inbound NAT rule".

The main form is titled "Add inbound NAT rule" and contains the following fields:

- Name \***: loadvm2rule
- Type**:  Azure virtual machine  Backend pool
- Target virtual machine**: loadvm2 (ResourceGroup: TP3RG, AvailabilitySet: -)
- Network IP configuration \***: ipconfig1 (10.0.0.5)
- Frontend IP address \***: loadfrontenedip (20.105.67.173)
- Frontend Port \***: 49153
- Service Tag \***: Custom
- Backend port \***: 3389
- Protocol**:  TCP

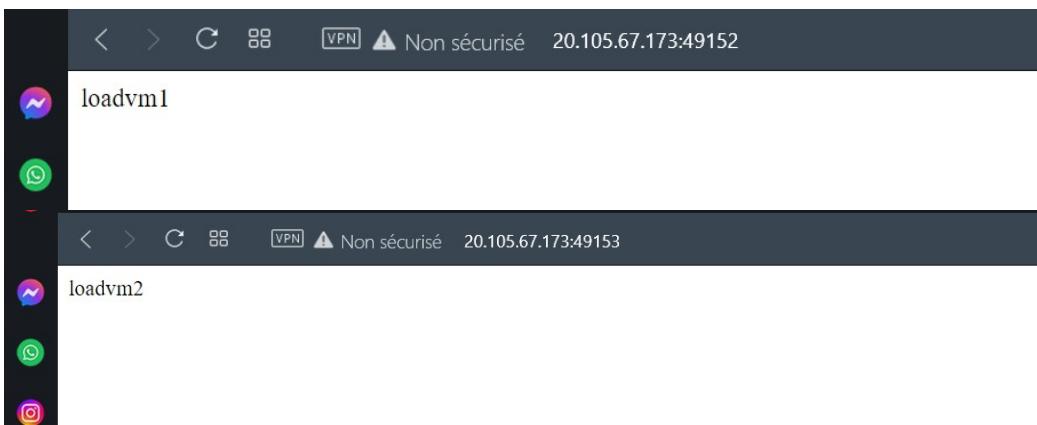
At the bottom of the form, there is a "Validating..." button and a "Give feedback" link.

The bottom part of the screenshot shows the "Inbound NAT rules" section for the "standloadbalancer" load balancer. The left sidebar lists various settings like Activity log, Access control (IAM), Tags, and Inbound NAT rules (which is currently selected). The main pane displays a table of existing rules:

Name ↑↓	Frontend IP ↑↓	Frontend port/range ↑↓	Target ↑↓	Service ↑↓
loadvm1rule	20.105.67.173	49152	loadvm1	RDP (TCP/3389)
loadvm2rule	20.105.67.173	49153	loadvm2	RDP (TCP/3389)

The URL in the browser's address bar is [https://portal.azure.com/?Microsoft\\_Azure\\_Education\\_correlationId=26d4284c8bd849fda998b5295c250348&Microsoft\\_Azure\\_Education\\_newA4E=true&Microsoft\\_Azure\\_Education\\_asoSubGuid=85030eba-08e4-4093-ab86-fa81b9f...](https://portal.azure.com/?Microsoft_Azure_Education_correlationId=26d4284c8bd849fda998b5295c250348&Microsoft_Azure_Education_newA4E=true&Microsoft_Azure_Education_asoSubGuid=85030eba-08e4-4093-ab86-fa81b9f...)

10-



11-

The image shows the Microsoft Azure portal interface. The left sidebar shows a navigation tree with 'Home > Virtual machines > loadvm1 > loadvm1-ip'. The main content area displays the 'loadvm1-ip' settings page. A modal dialog box is open, asking 'Do you want to dissociate 'loadvm1-ip' from network interface 'loadvm1551\_z1'?'. The 'Yes' button is highlighted in blue. Below the dialog, there is information about the resource: Subscription ID: 85030eba-08e4-4093-ab86-fa81b9f39a8b, DNS name: -, Associated to: [loadvm1551\\_z1](#). There are also sections for Tags (with a link to edit) and See more.

Microsoft Azure | portal.azure.com

Home > Create a virtual machine ...

Subscription \*  Resource group \*  Create new

Instance details

Virtual machine name \*  Region \*  Availability options  Availability zone \*   
You can now select multiple zones. Selecting multiple zones will create one VM per zone. [Learn more](#)

Security type  Configure security features

Image \*  See all images | Configure VM generation

**Review + create** < Previous Next : Disks > Give feedback

Microsoft Azure | portal.azure.com

Home > Create a virtual machine ...

Administrator account

Authentication type  Password

Username \*

Password \*  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 \*  Allow selected ports

Select inbound ports \*

⚠ 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

**Review + create** < Previous Next : Disks > Give feedback

12-

The screenshot shows the Microsoft Azure portal with a deployment named "CreateVm-canonical.0001-com-ubuntu-server-focal-2-20230323152546". The "Overview" tab is selected. A prominent message says "Your deployment is complete". Deployment details include a name, subscription, start time, and correlation ID. Next steps include auto-shutdown, monitoring, and running scripts. Buttons for "Go to resource" and "Create another VM" are at the bottom. A sidebar on the right offers links for cost management, Microsoft Defender for Cloud, free tutorials, and expert work.

The screenshot shows the Microsoft Azure portal with a resource named "loadvm1-ip". The "Overview" tab is selected. The "Essentials" section displays resource group (tp3rg), location (North Europe), subscription (Azure for Students), and a tag for adding. A "Notifications" sidebar on the right lists two events: "Saved network interface" (successfully saved IP address changes) and "Deployment succeeded" (deployment to resource group tp3rg was successful). Buttons for "Go to resource" and "Pin to dashboard" are present.

```
mouhib@linuxvm: ~
login as: mouhib
mouhib@20.13.144.239's password:
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-1034-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

System information as of Thu Mar 23 14:46:22 UTC 2023

System load:  0.02      Processes:          125
Usage of /:   5.2% of 28.89GB   Users logged in:    0
Memory usage: 2%           IPv4 address for eth0: 10.1.0.4
Swap usage:   0%

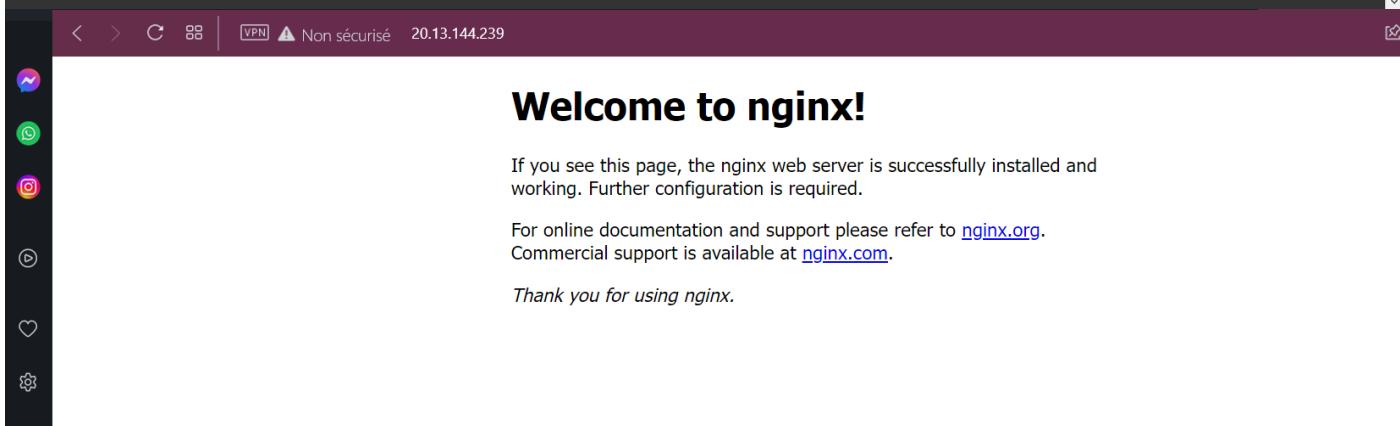
Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
```



**Deployment succeeded**  
Deployment 'RegionalLoadBalancerBackendPoolCreateOrUpdate-20230323155837-42' to resource group 'tp3rg' for successful.

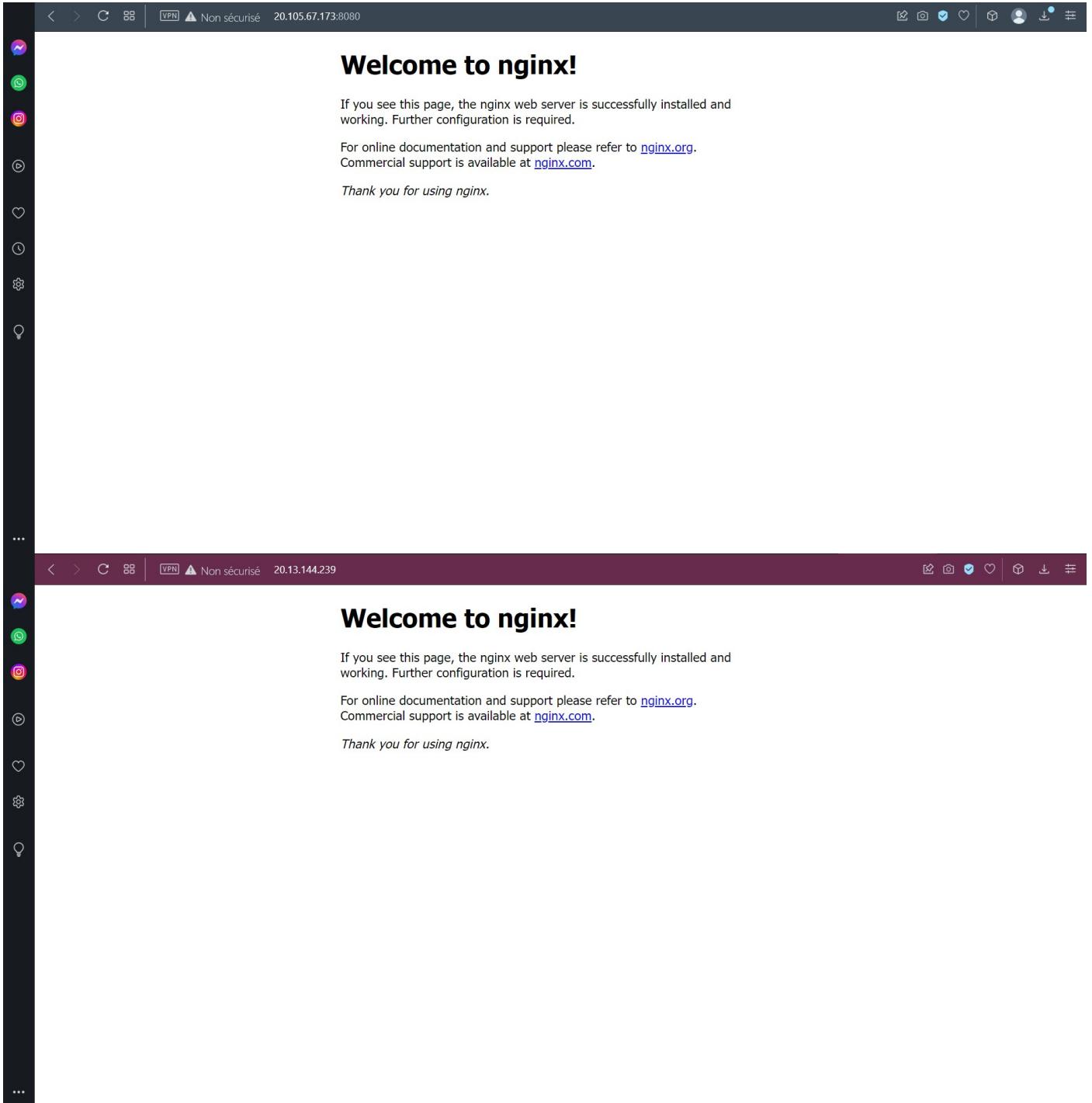
Backend pool	Resource Name	Resource Status	IP address	Network interface	Availability zone	Rules count
PoolA (2)						
PoolA	loadvm2	Running	10.0.0.5	loadvm2291_z1	1	1
PoolA	loadvm1	Running	10.0.0.4	loadvm1551_z1	1	1
PoolB (1)						0
PoolB						0

Backend pool	Resource Name	Resource Status	IP address	Network interface	Availability zone	Rules count
PoolA (2)						
PoolA	loadvm2	Running	10.0.0.5	loadvm2291_z1	1	1
PoolA	loadvm1	Running	10.0.0.4	loadvm1551_z1	1	1
PoolB (1)						0
PoolB	linuxvm	Running	10.0.0.6	linuxvm506_z1	1	0

The screenshot shows the Microsoft Azure portal interface for creating a new load balancing rule. The URL in the address bar is `portal.azure.com`. The current page is titled "Add load balancing rule" under the "standloadbalancer" resource. The configuration fields are as follows:

- Name \***: RuleB
- IP Version \***: IPv4 (selected)
- Frontend IP address \***: loadfrontenedip (20.105.67.173)
- Backend pool \***: PoolB
- Protocol**: TCP (selected)
- Port \***: 8080
- Backend port \***: 80
- Health probe \***: ProbeA (HTTP:80) (selected)
- Session persistence**: None
- Idle timeout (minutes) \***: 4
- Enable TCP Reset**: Unchecked
- Enable Floating IP**: Unchecked

At the bottom of the form are three buttons: "Save" (blue), "Cancel" (white), and "Give feedback" (blue).



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

Home > standloadbalancer

standloadbalancer | Backend pools

Backend pools

Backend pool	Resource Name	Resource Status	IP address	Network interface	Availability zone	Rules count
PoolA (1)	loadvm1	Running	10.0.0.4	loadvm1551_z1	1	1
PoolB (1)	linuxvm	Running	10.0.0.6	linuxvm506_z1	1	1

https://portal.azure.com/?Microsoft\_Azure\_Education\_correlationId=26d4284c8bd849fda998b5295c250348&Microsoft\_Azure\_Education\_newA4E=true&Microsoft\_Azure\_Education\_asoSubGuid=85030eba-08e4-4093-ab86-fa81b9f...

17-

20.105.67.173:49152 - Connexion Bureau à distance

res://iesetup.dll/HardAdmin.htm

Internet Explorer Enhanced S...

Internet Explorer

Content from the website listed below is being blocked by the Internet Explorer Enhanced Security Configuration.

about:internet

Continue to prompt when website content is blocked

[Learn more about Internet Explorer's Enhanced Security Configuration...](#)

If you trust this website, you can lower security settings for the site by adding it to the Trusted sites zone. If you know this website is on your local intranet, review help for instructions on adding the site to the local intranet zone instead.

Important: adding this website to the Trusted sites zone will lower the security settings for all content from this web site for all applications, including Internet Explorer.

[Home](#) > [standloadbalancer](#) | Outbound rules >

### Add outbound rule

standloadbalancer

Name \*

IP Version \*  IPv4  IPv6

Frontend IP address \*

Protocol  All  TCP  UDP

Idle timeout (minutes)  Max 100

TCP Reset  Enabled  Disabled

Backend pool \*

**Port allocation**

Azure automatically assigns the number of outbound ports to use for source network address translation (SNAT) based on the number of frontend IP addresses and backend pool instances. [Learn more about outbound connectivity](#)

Port allocation  Manually choose number of outbound ports

Outbound ports

Choose by \*

Ports per instance

Available frontend ports 63976

[Add](#) [Give feedback](#)

[Home](#) > [standloadbalancer](#)

### standloadbalancer | Outbound rules

Load balancer

Search

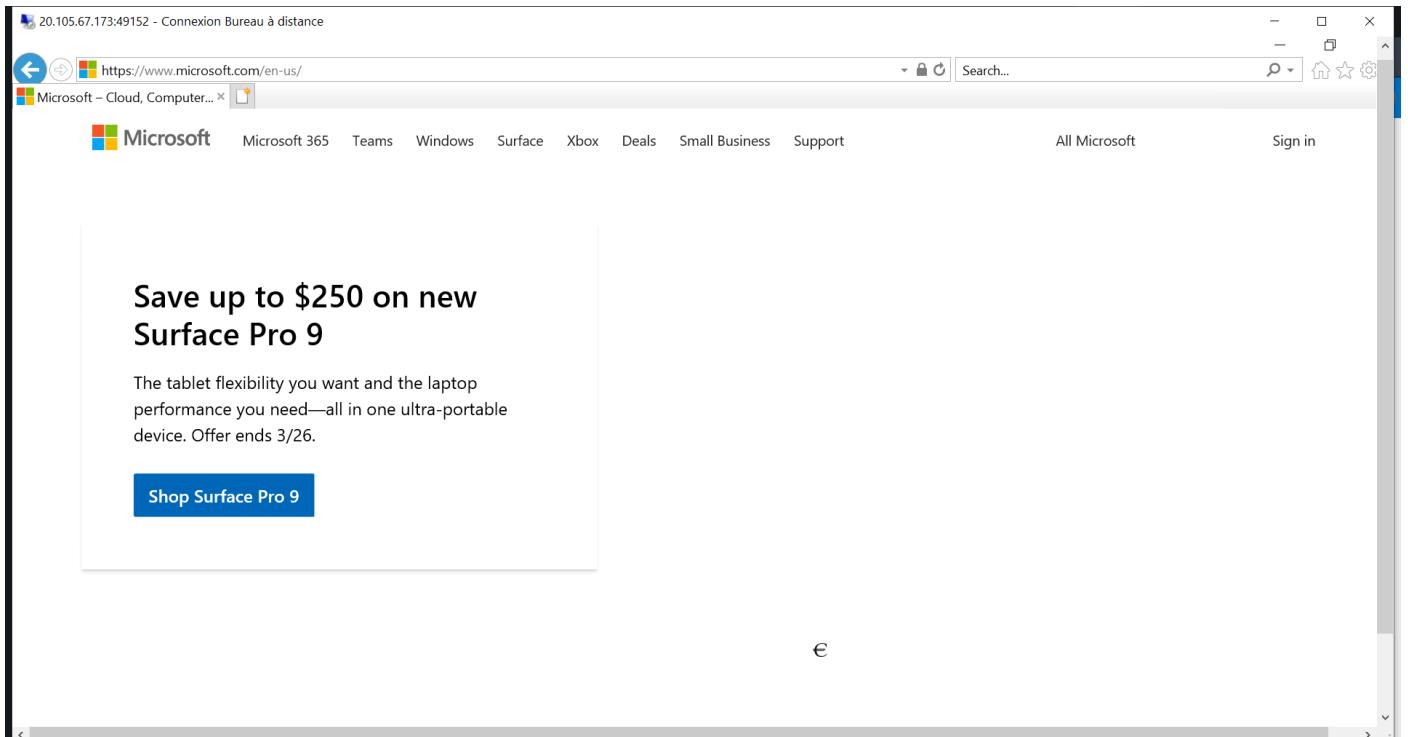
+ Add [Refresh](#) [Give feedback](#)

Use outbound rules to configure the outbound network address translation (NAT) for all virtual machines in the backend pool. To create an outbound rule, the load balancer SKU must be standard and the frontend IP configuration must have at least one public IP address. [Learn more about outbound connectivity](#)

Filter by name... Frontend IP address == all Backend == all Protocols == all

Name	Frontend	Backend	Protocols	Ports Per Instance	...
OutRuleloadvm1	loadfrontenedip	PoolA (1 instances)	TCP	16	<a href="#">...</a>

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



## Task 2

### Standard Load Balancer and VMSS:

1)

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

Home > Virtual machine scale sets > Create a virtual machine scale set ...

Subscription \* Azure for Students

Resource group \* (New) tp3rgvmss Create new

Scale set details

Virtual machine scale set name \* scaleset

Region \* (Europe) North Europe

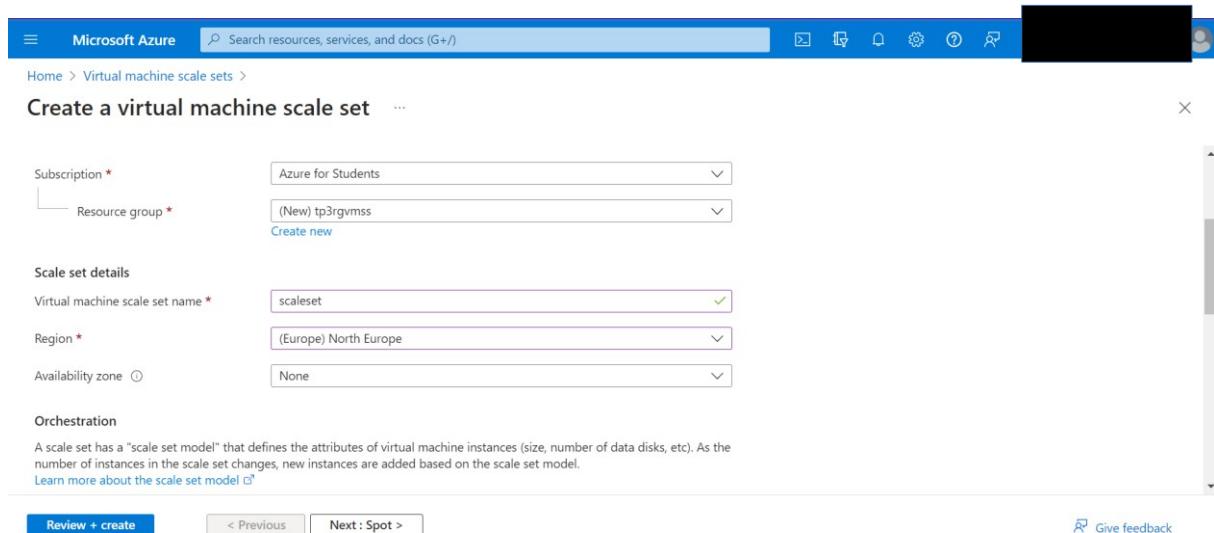
Availability zone None

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.

Learn more about the scale set model

Review + create < Previous Next : Spot > Give feedback



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

Home > Virtual machine scale sets > Create a virtual machine scale set ...

Image \* Windows Server 2019 Datacenter - x64 Gen2 See all images | Configure VM generation

VM architecture Arm64 x64

Arm64 is not supported with the selected image.

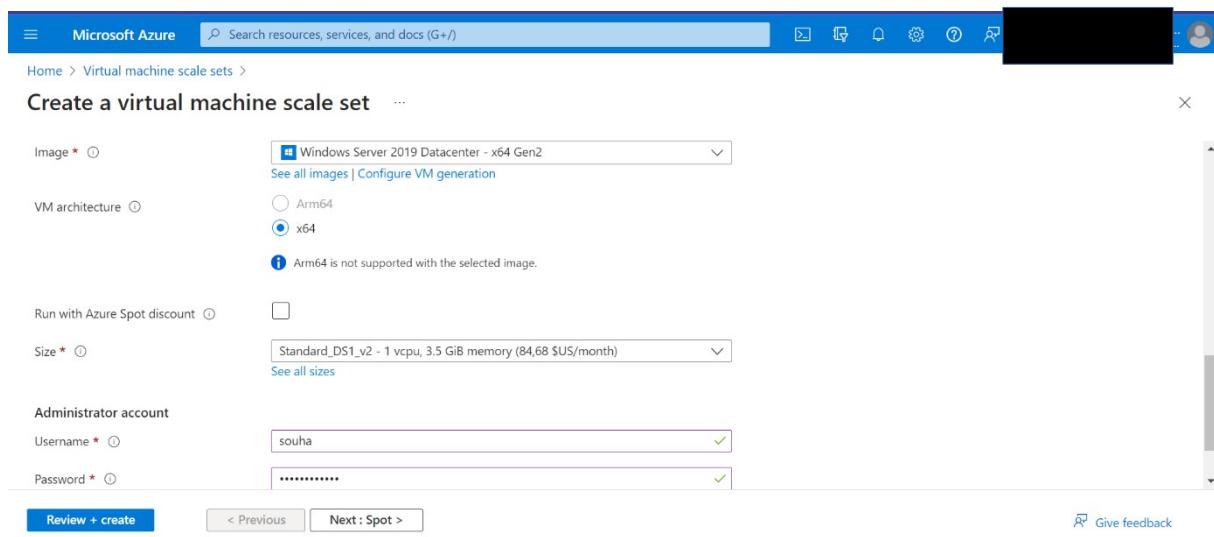
Run with Azure Spot discount

Size \* Standard\_DS1\_v2 - 1 vcpu, 3.5 GiB memory (84.68 \$US/month) See all sizes

Administrator account

Username \* souha

Password \* ..... Create < Previous Next : Spot > Give feedback



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 \* load2

Type \* Public

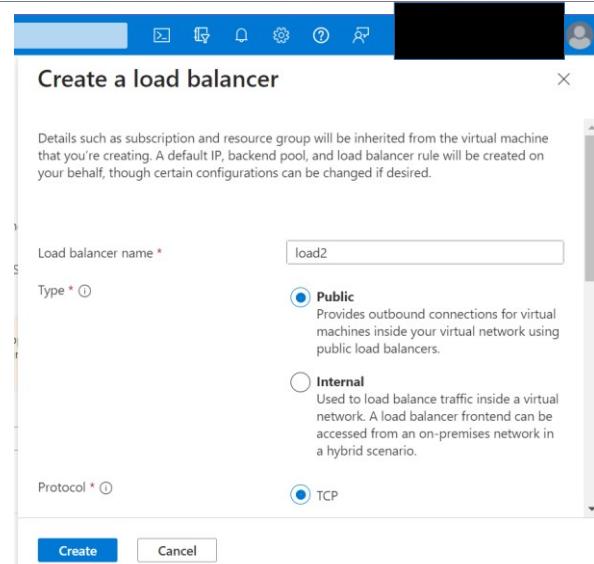
Provides outbound connections for virtual machines inside your virtual network using public load balancers.

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

Create Cancel



Microsoft Azure

Home > Virtual machine scale sets >

## Create a virtual machine scale set

**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 \*  [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.

NAME	CREATE PUBLI...	SUBNET	NETWORK SECURI...	ACCELERATED N...
tp3rgvms-vnet-nic01	No	default (10.0.0.0/20)	Basic	On

[Review + create](#) [< Previous](#) [Next : Scaling >](#) [Give feedback](#)

Microsoft Azure

Home > Virtual machine scale sets >

## Create a virtual machine scale set

**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.

Select a load balancer \*  [Create a load balancer](#)

[Review + create](#) [< Previous](#) [Next : Scaling >](#) [Give feedback](#)

Microsoft Azure

Home > Virtual machine scale sets >

## Create a virtual machine scale set

[Basics](#) [Spot](#) [Disks](#) [Networking](#) [Scaling](#) [Management](#) [Health](#) [Advanced](#) [Tags](#) [Review + create](#)

An Azure virtual machine scale set can automatically increase or decrease the number of VM instances that run your application. This automated and elastic behavior reduces the management overhead to monitor and optimize the performance of your application. [Learn more about VMSS scaling](#)

Initial instance count \*

**Scaling**

Scaling policy  Manual scaling  Autoscaling

**Scale-In policy**

Configure the order in which virtual machines are selected for deletion during a scale-in operation. [Learn more about scale-in policies](#)

[Review + create](#) [< Previous](#) [Next : Management >](#) [Give feedback](#)

## ⇒ Résultat:

Your deployment is complete

Deployment name: CreateVmss-MicrosoftWindowsServer.WindowsServer-2-20230329135309 | Start time: 3/29/2023, 2:03:18 PM  
Subscription: Azure for Students | Correlation ID: 84f33826-c310-40a4-b9  
Resource group: tp3gvmss

Resource	Type	Status	Operation details
scaleset	Microsoft.Compute/virtualMachineScaleSets	OK	<a href="#">Operation details</a>
load2	Microsoft.Network/loadBalancers	Created	<a href="#">Operation details</a>
tp3gvmss-vnet	Microsoft.Network/virtualNetworks	OK	<a href="#">Operation details</a>
load2-publicip	Microsoft.Network/publicIPAddresses	OK	<a href="#">Operation details</a>
basicNsntp3rgvmss-vnet	Microsoft.Network/networkInterfaces	OK	<a href="#">Operation details</a>

2)

scaleset | Instances

Instance	Computer name	Status	Protection policy	Provisioning state	Health state	Latest model
scaleset_0	scalesetg000000	Running		Succeeded		Yes

load2 | Frontend IP configuration

Name	IP address	Rules count
load2-frontendconfig01	40.69.83.89 (load2-publicip)	2

⇒ On affecte inbound rules et resource à PoolVMSS qu'on a créé :

The screenshot shows the Microsoft Azure Backend pools page for a load balancer named 'load2'. The left sidebar includes options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings, Frontend IP configuration, Backend pools (selected), Health probes, Load balancing rules, Inbound NAT rules, and Outbound rules. The main content area displays a table with columns: Backend pool, Resource Name, Resource Status, IP address, Network interface, Availability zone, and Rules count. It lists two entries: 'bepool (1)' with one resource and 'PoolVMSS (1)' with two resources. The 'PoolVMSS' entry has an IP address of 10.0.0.4 and is associated with the 'tp3rgvmss-vnet-nic0' network interface.

The screenshot shows the Microsoft Azure Health probes page for the same 'load2' load balancer. The left sidebar includes the same set of navigation items. The main content area shows a table with columns: Name, Protocol, Port, and Used By. A single probe named 'load2-probe01' is listed, using TCP protocol on port 80, and is used by the 'load2-lbrule01' rule.

The screenshot shows the Microsoft Azure Load balancing rules page for the 'load2' load balancer. The left sidebar includes the same set of navigation items. The main content area shows a table with columns: Name, Load balancing rule, Backend pool, and Health ... (partially visible). A single rule named 'load2-lbrule01' is listed, using the 'load2-lbrule01 (TCP/80)' load balancing rule, pointing to the 'PoolVMSS' backend pool.

The screenshot shows the Microsoft Azure Inbound NAT rules page for the 'load2' load balancer. The left sidebar includes the same set of navigation items. The main content area shows a table with columns: Name, Frontend IP, Frontend port/range, Target, and Service. A single rule named 'load2-natRule01' is listed, mapping the frontend IP 40.69.83.89 and port range 50000 - 50149 to the 'PoolVMSS' target and service RDP (TCP/3389).

3)

Création d'un compte de stockage ou on télécharge le script « install\_IIS.ps1 » :

The screenshot shows the Azure portal interface for configuring a custom script extension. At the top, there's a navigation bar with 'Microsoft Azure' and a search bar. Below it, the URL indicates the user is in the 'Extensions + applications' section of a resource group named 'tp3rgvmss'. The main form is titled 'Configure Custom Script Extension Extension'. It has a 'Script file (Required)' input field containing 'install\_IIS.ps1', a 'Browse' button, and an 'Arguments (Optional)' input field which is empty. At the bottom of the form are 'Create' and 'Cancel' buttons.

The screenshot shows the 'Microsoft.CustomScriptExtension | Overview' page. The deployment status is shown as 'Your deployment is complete' with a green checkmark. Deployment details are listed: name 'Microsoft.CustomScriptExt...', subscription 'Azure for Students', and resource group 'tp3rgvmss'. There are sections for 'Deployment details' and 'Next steps', and a 'Go to resource' button.

⇒ Upgrade de l'instance en utilisant custom script extension

The screenshot shows a 'Notifications' panel. It displays a single event: 'Upgraded virtual machine instance' with a green checkmark, followed by the message 'Successfully upgraded virtual machine instance 'scaleset\_0''. A timestamp 'a few seconds ago' is shown below the message. There are 'More events in the activity log →' and 'Dismiss all' buttons.

4)

5)

**Scale rule**

Metric source: Current resource (scaleset)

Resource type: Virtual machine scale sets / Resource: scaleset

Criteria

Metric namespace \*: Virtual Machine Host / Metric name: Percentage CPU

Dimension Name: VMName / Operator: = / Dimension Values: All values

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

0.6% — 0.4%

Add

**Scale rule**

Enable metric divide by instance count

Operator \*: Greater than / Metric threshold to trigger scale action \*: 0

Duration (minutes) \*: 1 / Time grain (minutes): 1

⚠ Setting a duration less than 5 minutes may generate transient metric spikes that leads to unexpected scaling actions. For best results, the duration should be set at least to 5 minutes.

Time grain statistic \*: Maximum / Time aggregation \*: Maximum

Action

Operation \*: Increase count by / Cool down (minutes) \*: 5

instance count \*: 1

Add

**scaleset | Scaling**

Virtual machine scale set

Save Discard Refresh Logs Feedback

Delete warning: The very last or default recurrence rule cannot be deleted. Instead, you can disable autoscale to turn off autoscale.

Scale mode: Scale based on a metric (selected) / Scale to a specific instance count

Rules: It is recommended to have at least one scale in rule. To create new rules, click Add a rule

Scale out: When scaleset (Maximum) Percentage CPU > 0 Increase count by 1

+ Add a rule

Instance limits: Minimum \*: 1 / Maximum \*: 3 / Default \*: 1

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

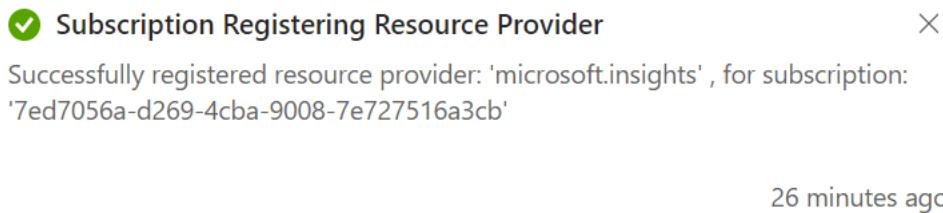
Si on click sur save :

**! Failed to update resource 'scaleset'**

There was an error saving setting for resource 'scaleset'. Detail message  
 {"error":{"code":"MissingSubscriptionRegistration","message":"The subscription is not registered to use namespace 'microsoft.insights'. See <https://aka.ms/rps-not-found> for how to register subscriptions."}}  
 [{"code ":"MissingSubscriptionRegistration","target ":"microsoft.insights","message ":"subscription is not registered to use namespace 'microsoft.insights'. See <https://aka.ms/rps-not-found> for how to register subscriptions."}]}, Please try again in a few moments.

10 minutes ago

⇒ Pour régler ce problème, il faut s'enregistrer dans « microsoft.insights » :



A screenshot of the Microsoft Azure portal showing the "Resource providers" section under "Azure for Students | Resource providers". A red box highlights the "Register" button. The table lists various providers and their status:

Provider	Status
Microsoft.Storage	Registered
Microsoft.Compute	Registered
Microsoft.Advisor	Registered
Microsoft.ChangeAnalysis	Registered
microsoft.insights	Registered
Dynatrace.Observability	NotRegistered
Github.Network	NotRegistered

⇒ Résultat de save de la règle ajoutée :

A screenshot of the Microsoft Azure portal showing a notification titled "Notifications". It displays a message: "More events in the activity log →" and "Resource 'scaleset' updated". The message continues: "Successfully updated configuration for 'scaleset'" and ends with "a few seconds ago".

6)

**scaleset | Instances**

Virtual machine scale set

Search virtual machine instances

Instance	Computer name	Status	Protection policy	Provisioning sta...	Health state	Latest model
scaleset_0	scalesetg000000	Running		Succeeded	Yes	
scaleset_3	scalesetg000003	Running		Succeeded	Yes	
scaleset_4	scalesetg000004	Running		Succeeded	Yes	

**load2 | Backend pools**

Load balancer

Backend pool

Backend pool	Resource Name	Resource Status	IP address	Network interface	Availability zone	Rules count
bepool (3)	bepool	scaleset (instance 0)	Running	10.0.0.4	tp3rgvmss-vnet-nic0 -	0
bepool (3)	bepool	scaleset (instance 3)	Running	10.0.0.6	tp3rgvmss-vnet-nic0 -	0
bepool (3)	bepool	scaleset (instance 4)	Running	10.0.0.5	tp3rgvmss-vnet-nic0 -	0
PoolVMSS (3)	PoolVMSS	scaleset (instance 0)	Running	10.0.0.4	tp3rgvmss-vnet-nic0 -	2
PoolVMSS (3)	PoolVMSS	scaleset (instance 3)	Running	10.0.0.6	tp3rgvmss-vnet-nic0 -	2
PoolVMSS (3)	PoolVMSS	scaleset (instance 4)	Running	10.0.0.5	tp3rgvmss-vnet-nic0 -	2

**load2 | Load balancing rules**

Load balancer

+ Add

Name	Load balancing rule	Backend pool	Health ...
load2-lbrule01	load2-lbrule01 (TCP/80)	PoolVMSS	load2-p...

**load2 | Inbound NAT rules**

Load balancer

+ Add

Name ↑	Frontend IP ↑	Frontend port/range ↑	Target ↑	Service ↑
load2-natRule01	40.69.83.89	50000 - 50149	PoolVMSS	RDP (TCP/3389)

⇒ Inbound NAT rules sont créés pour les nouvelles instances :

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

Home > Resource groups > tp3rgvms > load2 | Inbound NAT rules >

load2-natRule01 ...

Idle timeout (minutes) 4

Enable Floating IP

Port mapping

Port mappings are subject to change if configuration changes are made to properties of the inbound NAT rule including backend port, frontend port range start, and maximum number of backend instances in backend pool.

Resource Name ↑↓	Frontend Port ↑↓	Endpoint ↑↓	Backend port ↑↓
scaleset (instance 0)	50000	https://40.69.83.89:50000	3389
scaleset (instance 3)	50002	https://40.69.83.89:50002	3389
scaleset (instance 4)	50001	https://40.69.83.89:50001	3389

Save Cancel Give feedback

### Task 3

#### Azure Application Gateway:

1-

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

Home > Virtual networks >

Create virtual network ...

Basics IP Addresses Security Tags Review + create

Azure Virtual Network (VNet) is the fundamental building block for your private network in Azure. VNet enables many types of Azure resources, such as Azure Virtual Machines (VM), to securely communicate with each other, the internet, and on-premises networks. VNet is similar to a traditional network that you'd operate in your own data center, but brings with it additional benefits of Azure's infrastructure such as scale, availability, and isolation. [Learn more about virtual network](#)

Project details

Subscription \* Azure for Students

Resource group \* (New) tp3rgag

Instance details

Name \* vnet1

Region \* North Europe

Review + create < Previous Next : IP Addresses > Download a template for automation

Microsoft Azure | portal.azure.com

Microsoft.VirtualNetwork-20230324173132 | Overview

Your deployment is complete

Deployment name: Microsoft.VirtualNetwork-20230324173132 Start time: 3/24/2023, 5:35:14 PM  
Subscription: Azure for Students Correlation ID: 9d12e0db-0ff4-4f3e-af8c-df488e7fe86c  
Resource group: tp3rgag

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 >

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Microsoft Azure | portal.azure.com

Home > Virtual networks > Create virtual network

The virtual network's address space, specified as one or more address prefixes in CIDR notation (e.g. 192.168.1.0/24).

IPv4 address space

10.0.0.0/16 10.0.0.0 - 10.0.255.255 (65536 addresses)

Add IPv6 address space

The subnet's address range in CIDR notation (e.g. 192.168.1.0/24). It must be contained by the address space of the virtual network.

+ Add subnet Remove subnet

Subnet name	Subnet address range	NAT gateway
default	10.0.0.0/24	-
appSubnet	10.0.1.0/24	-

A NAT gateway is recommended for outbound internet access from subnets. Edit the subnet to add a NAT gateway. [Learn more](#)

Review + create < Previous Next : Security > Download a template for automation

2-

**Create a virtual machine**

Subscription \*  Resource group \*  Create new

**Instance details**

Virtual machine name \*

Region \*

Availability options

Availability zone \*  You can now select multiple zones. Selecting multiple zones will create one VM per zone. [Learn more](#)

Security type  Configure security features

Image \*  See all images | Configure VM generation

**Review + create** < Previous Next : Disks > Give feedback

**Create a virtual machine**

Run with Azure Spot discount

Size \*  See all sizes

**Administrator account**

Username \*

Password \*

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 \*

**Review + create** < Previous Next : Disks > Give feedback

Microsoft Azure | portal.azure.com

## Create a virtual machine

Networking

Virtual network \* vnet1  
Subnet \* appSubnet (10.0.1.0/24)  
Public IP (new) appvimage-ip  
NIC network security group Basic

Review + create < Previous Next : Management > Give feedback

[https://portal.azure.com/?Microsoft\\_Azure\\_Education\\_correlationId=26d4284c8bd849fda998b5295c250348&Microsoft\\_Azure\\_Education\\_newA4E=true&Microsoft\\_Azure\\_Education\\_asoSubGuid=85030eba-08e4-4093-ab86-fa81b9f...](https://portal.azure.com/?Microsoft_Azure_Education_correlationId=26d4284c8bd849fda998b5295c250348&Microsoft_Azure_Education_newA4E=true&Microsoft_Azure_Education_asoSubGuid=85030eba-08e4-4093-ab86-fa81b9f...)

Microsoft Azure | portal.azure.com

## CreateVm-MicrosoftWindowsServer.WindowsServer-201-20230324173933 | Overview

Deployment

Search Delete Cancel Redeploy Download Refresh

Overview Your deployment is complete Deployment name: CreateVm-MicrosoftWindowsServer.Window... Start time: 3/24/2023, 5:44:37 PM Subscription: Azure for Students Correlation ID: e8e4306d-6495-4172-91a4-2: Resource group: tp3rgag

Deployment details

Next steps

Setup auto-shutdown Recommended  
Monitor VM health, performance and network dependencies Recommended  
Run a script inside the virtual machine Recommended

Go to resource Create another VM

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 >

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[https://portal.azure.com/?Microsoft\\_Azure\\_Education\\_correlationId=26d4284c8bd849fda998b5295c250348&Microsoft\\_Azure\\_Education\\_newA4E=true&Microsoft\\_Azure\\_Education\\_asoSubGuid=85030eba-08e4-4093-ab86-fa81b9f...](https://portal.azure.com/?Microsoft_Azure_Education_correlationId=26d4284c8bd849fda998b5295c250348&Microsoft_Azure_Education_newA4E=true&Microsoft_Azure_Education_asoSubGuid=85030eba-08e4-4093-ab86-fa81b9f...)

Microsoft Azure | portal.azure.com

Home > Create a resource > Create a virtual machine

Subscription \*  Resource group \*  Create new

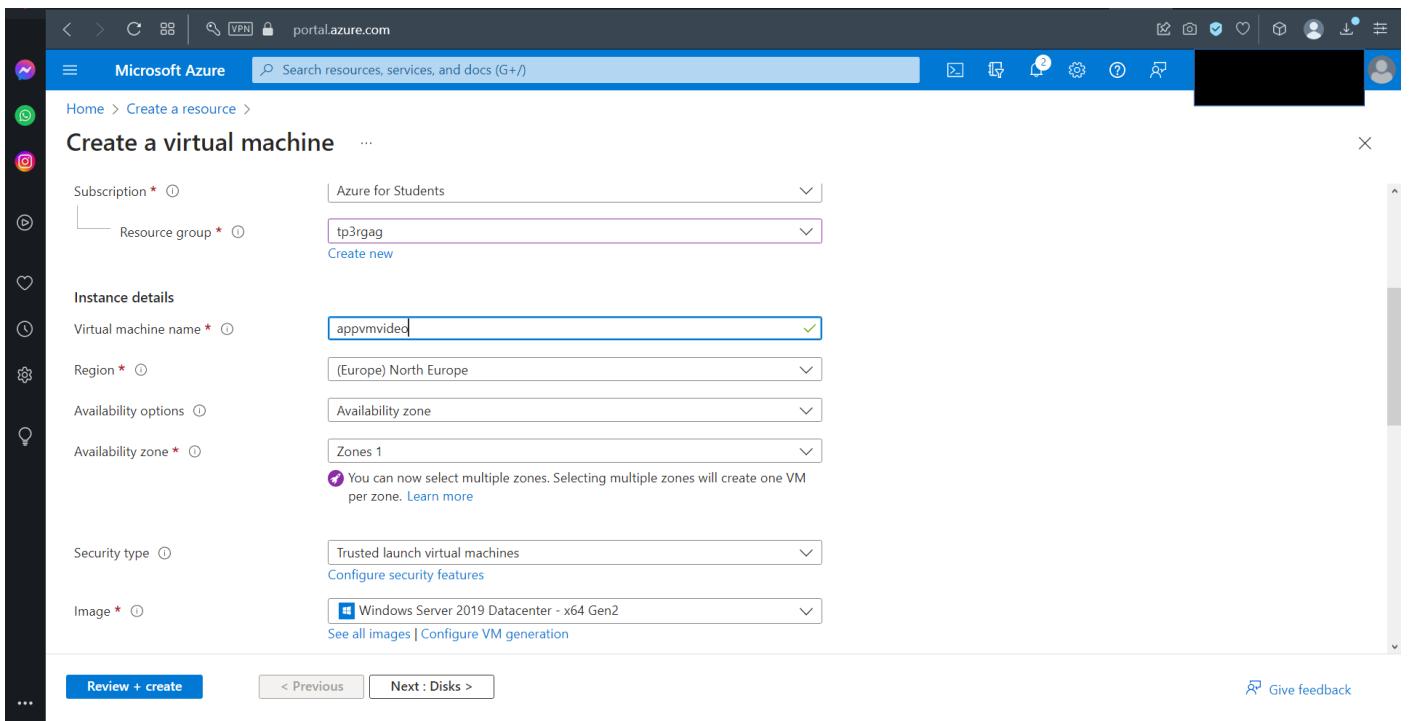
Instance details

Virtual machine name \*  Region \*  Availability options  Availability zone \*   
You can now select multiple zones. Selecting multiple zones will create one VM per zone. [Learn more](#)

Security type  Configure security features

Image \*  See all images | Configure VM generation

[Review + create](#) < Previous Next : Disks > Give feedback



Microsoft Azure | portal.azure.com

Home > Create a resource > Create a virtual machine

Size \*  See all sizes

Administrator account

Username \*  Password \*  Confirm password \*

Inbound port rules

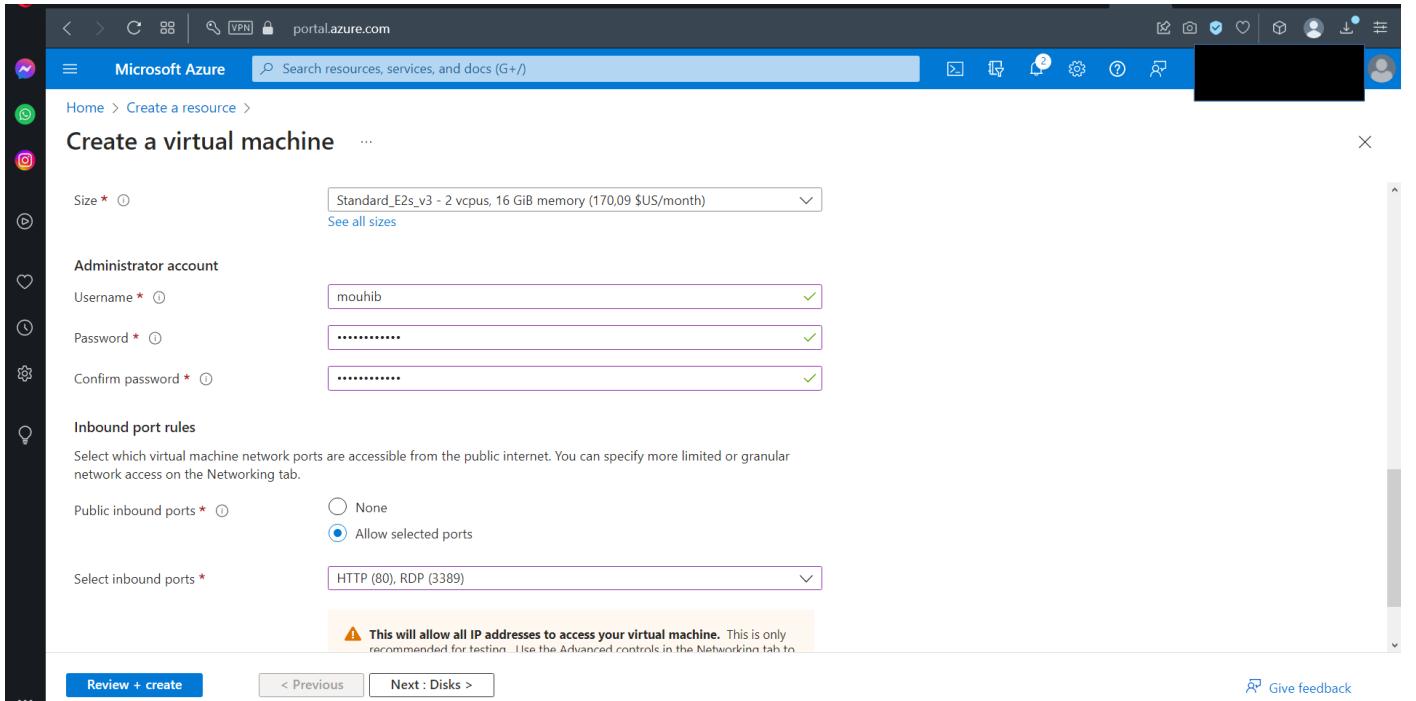
Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports \*  None  Allow selected ports

Select inbound ports \*

**⚠️ 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

[Review + create](#) < Previous Next : Disks > Give feedback



Microsoft Azure | portal.azure.com

## Create a virtual machine

Learn more

**Network interface**

When creating a virtual machine, a network interface will be created for you.

Virtual network \* vnet1  
Create new

Subnet \* appSubnet (10.0.1.0/24)  
Manage subnet configuration

Public IP (new) appvmvideo-ip  
Create new

NIC network security group None  
Basic (selected)  
Advanced

Public inbound ports \* None  
Allow selected ports

Select inbound ports \* HTTP (80), RDP (3389)

**Review + create** < Previous Next : Management > Give feedback

This screenshot shows the 'Create a virtual machine' wizard on the 'Network interface' step. It includes fields for selecting a virtual network (vnet1), subnet (appSubnet), public IP address, and inbound port settings (HTTP and RDP). Buttons for 'Review + create' and 'Give feedback' are at the bottom.

Microsoft Azure | portal.azure.com

## CreateVm-MicrosoftWindowsServer.WindowsServer-201-20230324174734 | Overview

Deployment

Search Delete Cancel Redeploy Download Refresh

**Your deployment is complete**

Deployment name: CreateVm-MicrosoftWindowsServer.Window... Start time: 3/24/2023, 5:51:38 PM  
Subscription: Azure for Students Correlation ID: c261e605-43e4-44e6-bdde-b...

**Deployment details**

**Next steps**

- Setup auto-shutdown Recommended
- Monitor VM health, performance and network dependencies Recommended
- Run a script inside the virtual machine Recommended

Go to resource Create another VM

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 >

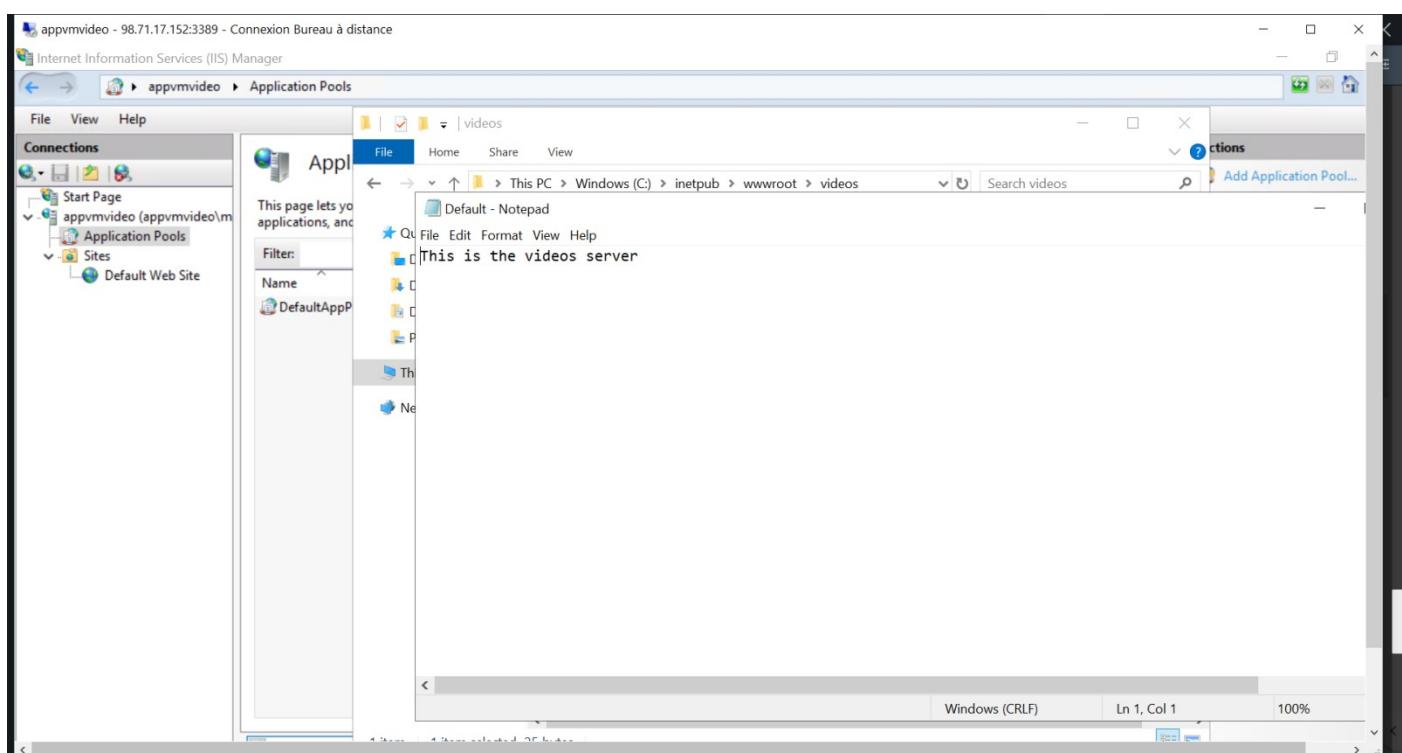
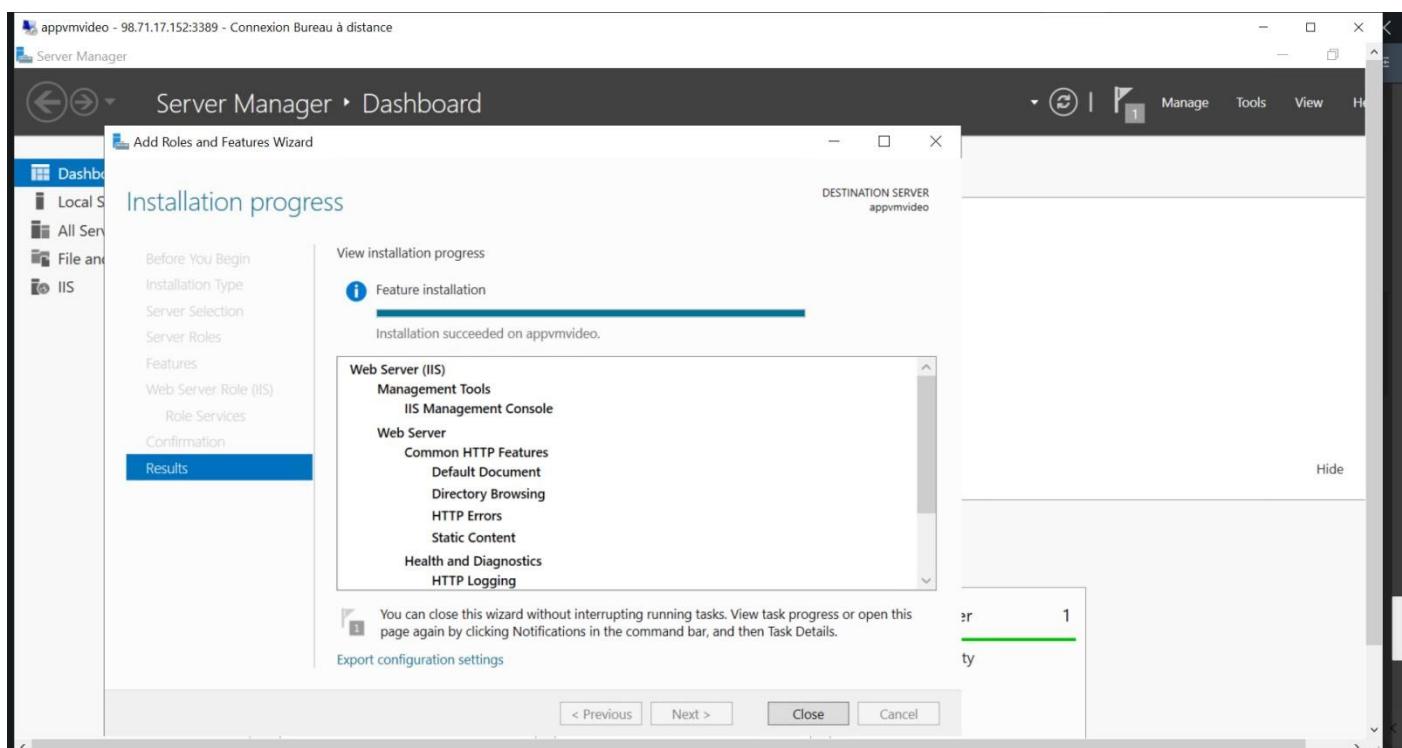
**Microsoft Defender for Cloud**  
Secure your apps and infrastructure  
Go to Microsoft Defender for Cloud >

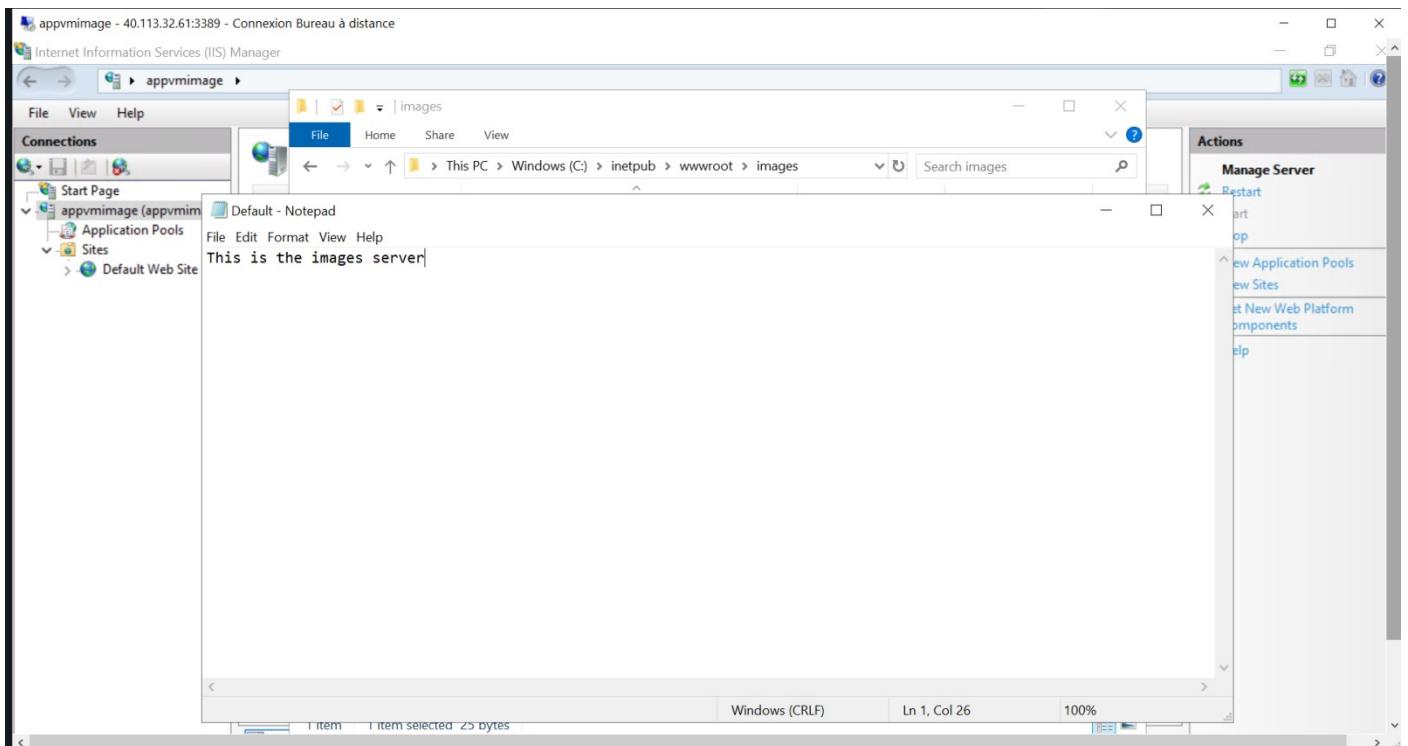
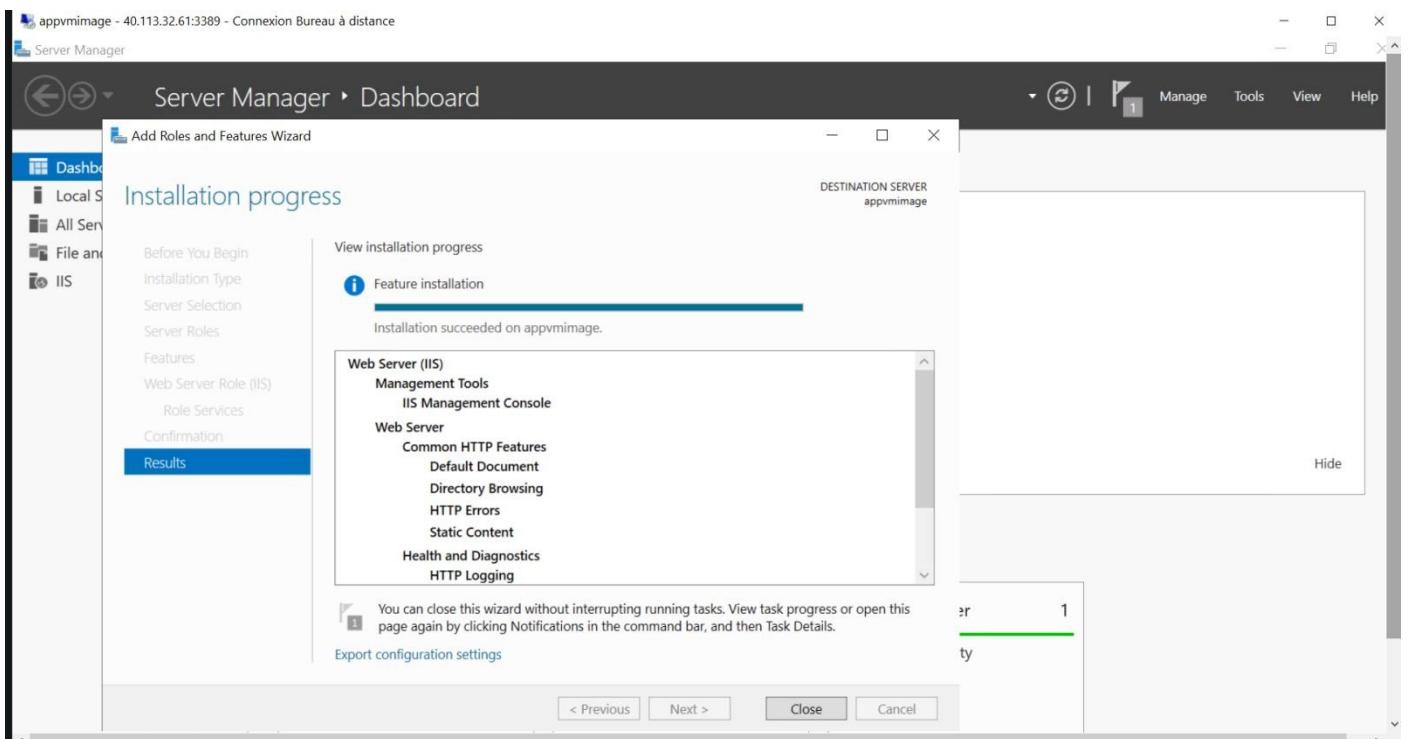
**Free Microsoft tutorials**  
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This screenshot shows the deployment overview for a completed Windows Server 2021 VM. It displays deployment details like name, start time, and correlation ID. It also lists next steps such as auto-shutdown setup and monitoring. A sidebar on the right provides links to cost management, Microsoft Defender for Cloud, free tutorials, and expert work options.

1-





2-

Microsoft Azure | portal.azure.com

Home > Create application gateway ...

**Instance details**

Application gateway name \* appgateway ✓

Region \* North Europe ✓

Tier Standard V2 ✓

Enable autoscaling  Yes  No

Instance count 1 ✓

Availability zone None ✓

HTTP2  Disabled  Enabled

**Configure virtual network**

Virtual network \* vnet1 ✓  
Create new

Subnet \* appSubnett (10.0.2.0/24) ✓  
Manage subnet configuration

Previous Next : Frontends >

https://portal.azure.com/?Microsoft\_Azure\_Education\_correlationId=26d4284c8bd849fda998b5295c250348&Microsoft\_Azure\_Education\_newA4E=true&Microsoft\_Azure\_Education\_asoSubGuid=85030eba-08e4-4093-ab86-fa81b9f...

Microsoft Azure | portal.azure.com

Home > Create application gateway ...

✓ Basics 2 Frontends 3 Backends 4 Configuration 5 Tags 6 Review + create

Traffic enters the application gateway via its frontend IP address(es). An application gateway can use a public IP address, private IP address, or one of each type. [View documentation](#)

Frontend IP address type  Public  Private  Both

Public IP address \* (New) tp3ip ✓  
Add new

Previous Next : Backends >

[portal.azure.com](#)

## Create application gateway

Basics Frontends Backends Configuration Tags Review + create

A backend pool is a collection of resources to which your application gateway can send traffic. A backend pool can contain virtual machines, virtual machine scale sets, app services, IP addresses, or fully qualified domain names (FQDN).

Add a backend pool

Backend pool	Targets	...
imagespool	> 1 target	...
videospool	> 1 target	...

Previous Next : Configuration >

[portal.azure.com](#)

## Create application gateway

Basics Frontends Backends Configuration Tags

Create routing rules that link your frontend(s) and backend(s). You can also add

### Frontends

+ Add a frontend IP  
Public: (new) tp3ip

### Add a routing rule

Configure a routing rule to send traffic from a given frontend IP address to one or more backend targets. A routing rule must contain a listener and at least one backend target.

Rule name \* RuleA

Priority \* 1

\* Listener \* Backend targets

A listener "listens" on a specified port and IP address for traffic that uses a specified protocol. If the listener criteria are met, the application gateway will apply this routing rule.

Listener name \* listener

Frontend IP \* Public

Protocol  HTTP  HTTPS

Port \* 80

Additional settings

Listener type  Basic  Multi site

Error page url  Yes  No

Previous Next : Tags > Add Cancel

[Home >](#)

## Create application gateway

✓ Basics ✓ Frontends ✓ Backends **4 Configuration** (5)

Create routing rules that link your frontend(s) and backend(s). You can also add

**Frontends**

+ Add a frontend IP

Public: (new) tp3ip

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**Add a path**

← Discard changes and go back to routing rules

Target type  Backend pool  Redirection

Path \*

Target name \*

Backend settings \*

Backend target \*

Add new

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**Add a path**

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Target type  Backend pool  Redirection

Path \*

Target name \*

**Target name must be unique**

Backend settings \*

Backend target \*

Add new

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Add a path

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Basics Frontends Backends Configuration (5)

Create routing rules that link your frontend(s) and backend(s). You can also add

Frontends

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Public: (new) tp3ip ...

Target type  Backend pool  Redirection

Path \* ① /videos/\*

Target name \* videotarget

Backend settings \* ①

Backend target \* ①

Add new commonsetting

Add new videospool

Add new

Cancel

**Add a routing rule**

Rule name  ✓

Priority  ✓

\*Listener  \*Backend targets

Choose a backend pool to which this routing rule will send traffic. You will also need to specify a set of Backend settings that define the behavior of the routing rule.<sup>1</sup>

Target type  Backend pool  Redirection

Backend target   imagespool

Backend settings  commonsetting  Add new

**Path-based routing**

You can route traffic from this rule's listener to different backend targets based on the URL path of the request. You can also apply a different set of Backend settings based on the URL path.<sup>2</sup>

Path	Target name	Backend setting name	Backend pool	...
/images/*	imagetarget	commonsetting	imagespool	...
/videos/*	videotarget	commonsetting	videospool	...

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Microsoft Azure | portal.azure.com

Microsoft.ApplicationGateway-20230324234223 | Overview

Your deployment is complete

Deployment name: Microsoft.ApplicationGateway-2023... Start time: 3/24/2023, 11:49:37 PM  
Subscription: Azure for Students Correlation ID: 8a1fbcd7-9765-4501-adbb-2b5b9c193  
Resource group: tp3rgag

Deployment details

Next steps

Go to resource group

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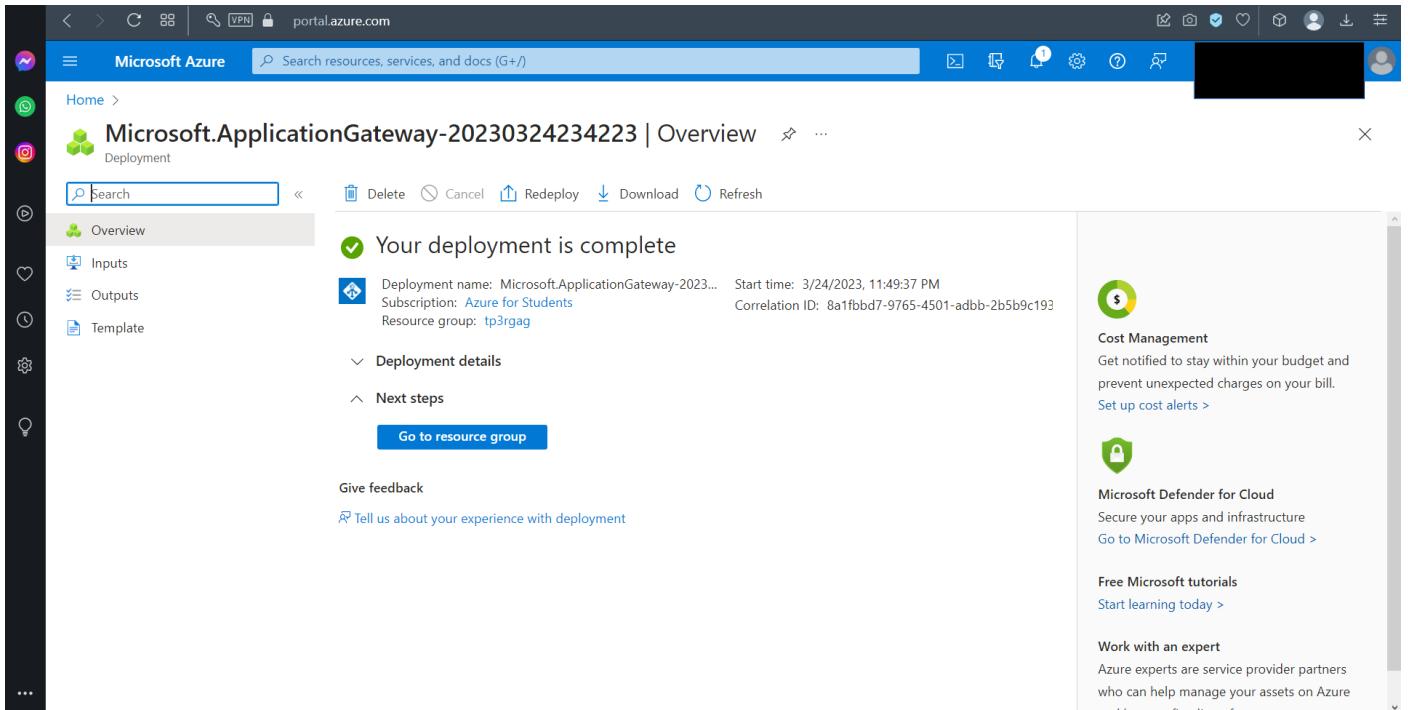
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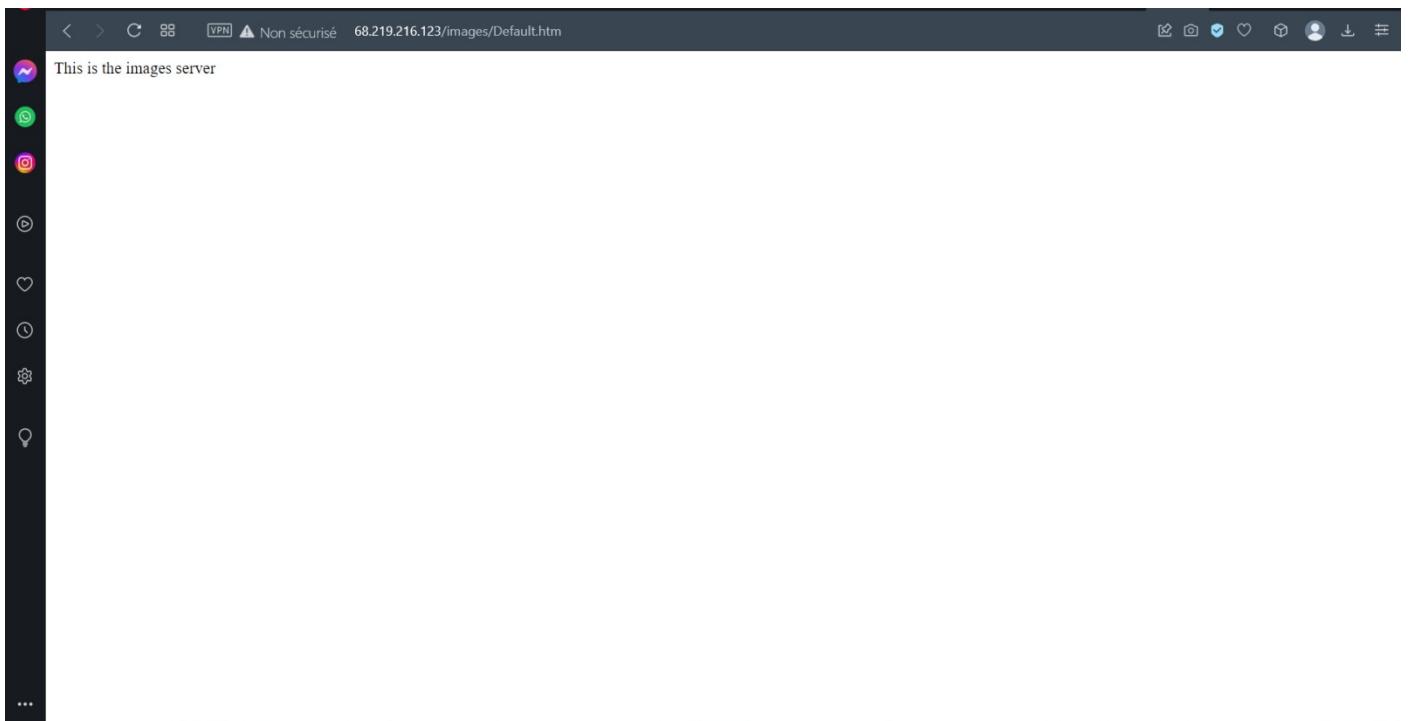
Work with an expert

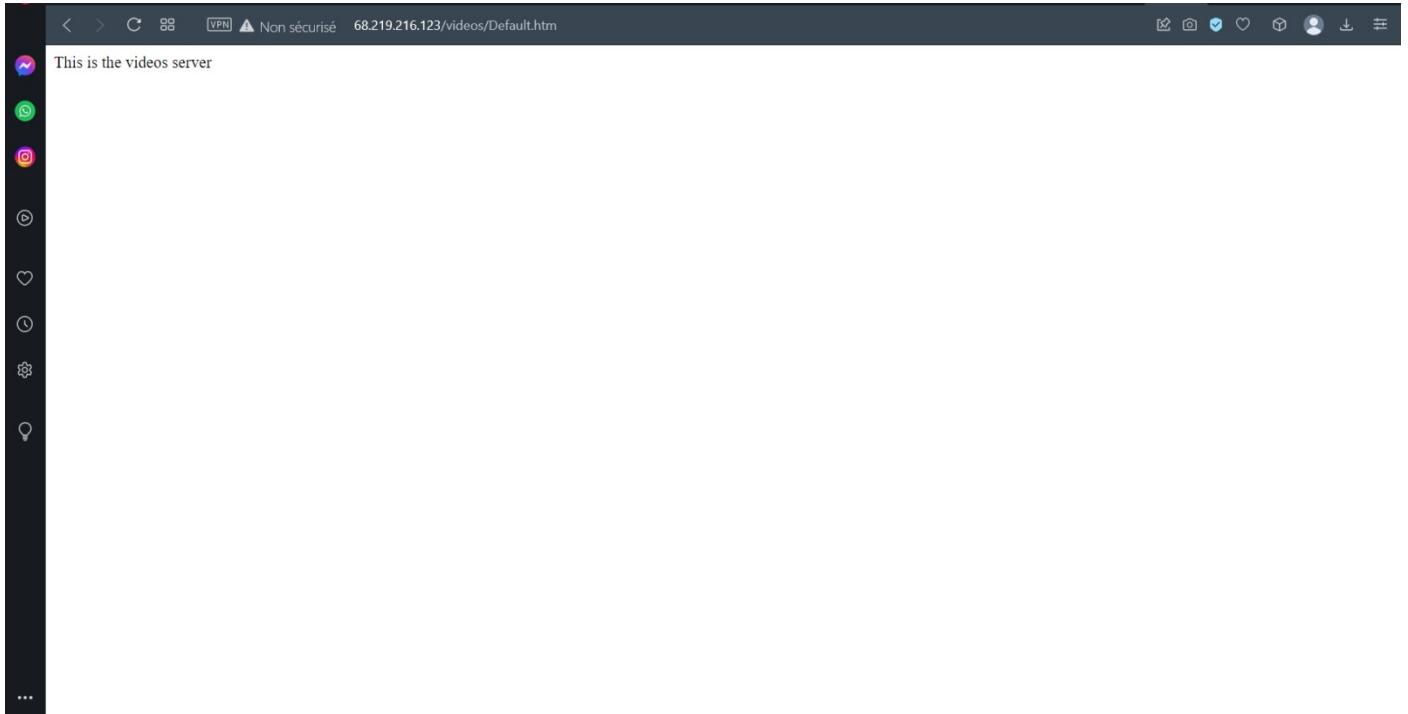
Azure experts are service provider partners who can help manage your assets on Azure



3-

This is the images server





## Interprétations:

### I. Standard Load Balancer

Un Load Balancer Azure est un service d'équilibrage de charge entrant et sortant de la couche 4 du modèle d'interconnexion des systèmes ouverts (OSI) à très faible latence pour tous les protocoles UDP et TCP.

Le Load Balancer applicatif peut gérer des millions de requêtes par seconde et organise le trafic entrant entre les machines virtuelles afin d'assurer une haute disponibilité.

Le Load Balancer élastique Azure garantit en outre une haute disponibilité entre les zones de disponibilité en restant redondant au niveau de la zone.

Le Load Balancer Azure classique permet aux utilisateurs de configurer l'IP frontale (frontend IP address) pour inclure une ou plusieurs adresses IP publiques. La configuration de l'IP frontale rend les applications et le Load Balancer Azure accessibles sur internet.

Les machines virtuelles sont configurées à l'aide des cartes d'interface réseau virtuelles (NIC – Network Interface Cards) pour se connecter à un Load Balancer logiciel Azure.

Un pool d'adresses back-end connecté au Load Balancer standard Azure contient les adresses IP des cartes d'interface réseau virtuelles (NIC) pour distribuer le trafic aux machines virtuelles.

Il surveille ensuite les ports spécifiques de chaque VM à l'aide d'un health probe afin de s'assurer que seules les VM opérationnelles reçoivent du trafic.

\*- Health probe ;

Les règles d'Azure Load Balancer nécessitent une sonde de santé (health probe) pour détecter l'état du point d'extrémité (endpoint status). La configuration de la sonde de santé et de ses réponses détermine quelles instances de pool de backend recevront de nouvelles connexions.

On peut utiliser les health probes pour détecter la défaillance d'une application, générer une réponse personnalisée à un health probe, contrôler des flux afin de gérer la charge ou les temps d'arrêt planifiés. Lorsqu'une sonde de santé échoue, le Load Balancer cesse d'envoyer de nouvelles connexions à l'instance malsaine concernée. La connectivité sortante n'est pas affectée, seule la connectivité entrante l'est.

Les health probes prennent en charge plusieurs protocoles (comme TCP, http, HTTPS)...

\*- Parmi les cas d'utilisation de l'Azure Standard Load Balancer, on peut citer :

- Équilibrer le trafic interne et externe des machines virtuelles Azure.
- Équilibrer les services sur plusieurs adresses IP, ports ou les deux.
- Configurer la connectivité sortante des machines virtuelles Azure.
- Surveiller les ressources équilibrées en charge à l'aide de sondes de santé.
- Accéder aux machines virtuelles d'un réseau virtuel par port et par adresse IP publique grâce à la redirection de port.
- Prendre en charge de l'équilibrage de charge IPv6.
- Distribuer les ressources à l'intérieur des zones et entre les zones pour augmenter la disponibilité.
- Il fournit des mesures multidimensionnelles qui peuvent être regroupées, filtrées et décomposées via Azure Monitor.
- Déplacer les ressources de l'équilibrEUR de charge, internes et externes, entre les régions Azure.

\*- Autoscaling :

La mise à l'échelle automatique permet aux entreprises de mettre à l'échelle les services cloud tels que les instances de machines virtuelles ou les capacités de serveurs, à la hausse ou à la baisse, automatiquement, en fonction de conditions définies telles que les niveaux d'utilisation, le trafic ou d'autres critères. Elle permet d'économiser de l'argent en augmentant ou en diminuant automatiquement la capacité des instances.

## II. Standard Load Balancer and VMSS

VMSS ; Virtual Machine Scale Set. C'est une fonctionnalité d'Azure qui permet de créer et gérer un groupe de machines virtuelles avec charge équilibrée.

On peut également augmenter le nombre d'instances de machines virtuelles ou le diminuer d'une façon automatique en fonction de la demande ou d'un calendrier défini.

Parmi les avantages que peuvent offrir les scales sets on peut citer :

- Faciliter la création de plusieurs VMs tout en offrant la possibilité de les gérer facilement.
- Permet une adaptation automatique d'un application en fonction de l'évolution de la demande en ressources.
- Peut fonctionner à grande échelle avec l'orchestration flexible. (Avec cette orchestration flexible, Azure garantie une très forte haute disponibilité jusqu'à 1000 VMs...). Cela permet l'extension de l'application tout en maintenant l'isolation du domaine de défaillance.
- En permettant la distribution des VMs sur plusieurs zones de disponibilités ou domaines de défaillances (fault domains), elle fournit la haute disponibilité.

\*- Les domaines de défaillance définissent le groupe de machines virtuelles qui partagent une source d'alimentation et un commutateur réseau communs. Par défaut, les machines virtuelles configurées dans votre ensemble de disponibilité sont réparties sur un maximum de trois domaines de défaillance.

### **III. Azure Application Gateway**

Azure Application Gateway est un Load Balancer du trafic web qui permet de gérer le trafic vers les applications web.

Les Load Balancers traditionnels fonctionnent au niveau de la couche de transport (couche 4 de l'OSI - TCP et UDP) et acheminent le trafic en fonction de l'adresse IP et du port source, vers une adresse IP et un port de destination.

Application Gateway peut prendre des décisions de routage basées sur des attributs supplémentaires d'une requête HTTP, par exemple le chemin URI ou les en-têtes d'hôte. Comme le travail fait dans ce TP, où on achemine le trafic entre les deux serveur image et video en ajoutant le « path » vers le serveur voulu (en utilisant la même adresse IP publique et en ajoutant le suffixe @IP/images/Default.html, ou @IP/videos/Default.html).