Compte Rendu de Travaux Pratiques

Compte Rendu - Travaux Pratiques En Cloud & Virtualisation

Filière : Réseaux Informatiques & Télécommunications
Niveau : 4ème Année

Sujet :

TP4 : Traffic Manager, Firewall, Storage Account

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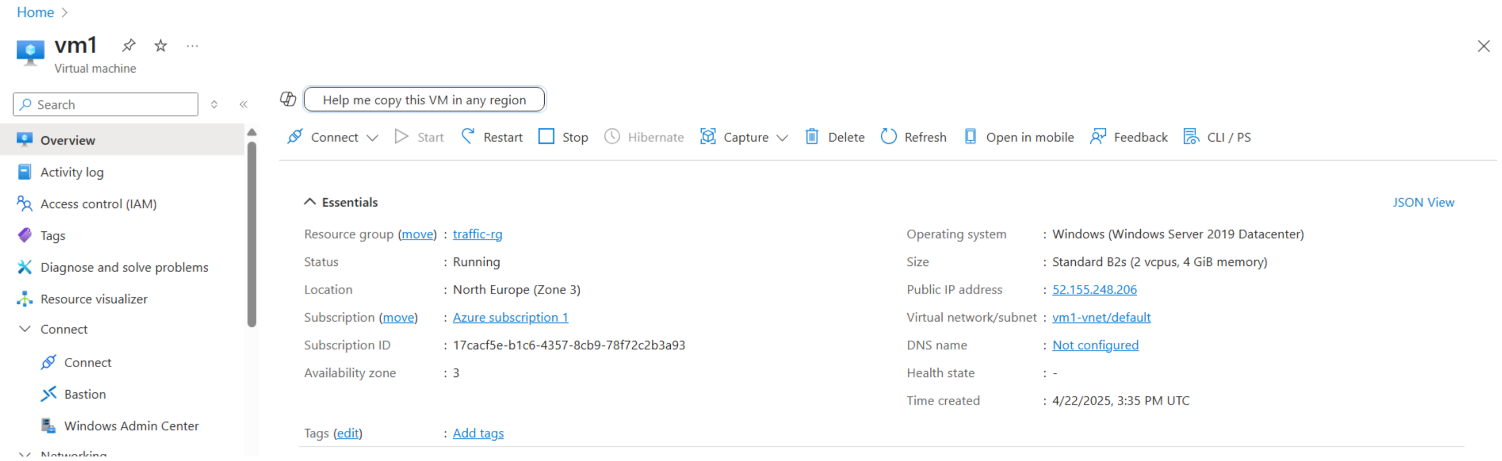
Yassine BELARBI

Année Universitaire : 2024-25

TASK 01

1. a/b We have successfully created the two VMs and installed IIS on each.



Essentials

Resource group (move) : traffic-rg

Status : Running

Location : North Europe (Zone 3)

Subscription (move) : Azure subscription 1

Subscription ID : 17cacf5e-b1c6-4357-8cb9-78f72c2b3a93

Availability zone : 3

Operating system : Windows (Windows Server 2019 Datacenter)

Size : Standard B2s (2 vcpus, 4 GiB memory)

Public IP address : 52.155.248.206

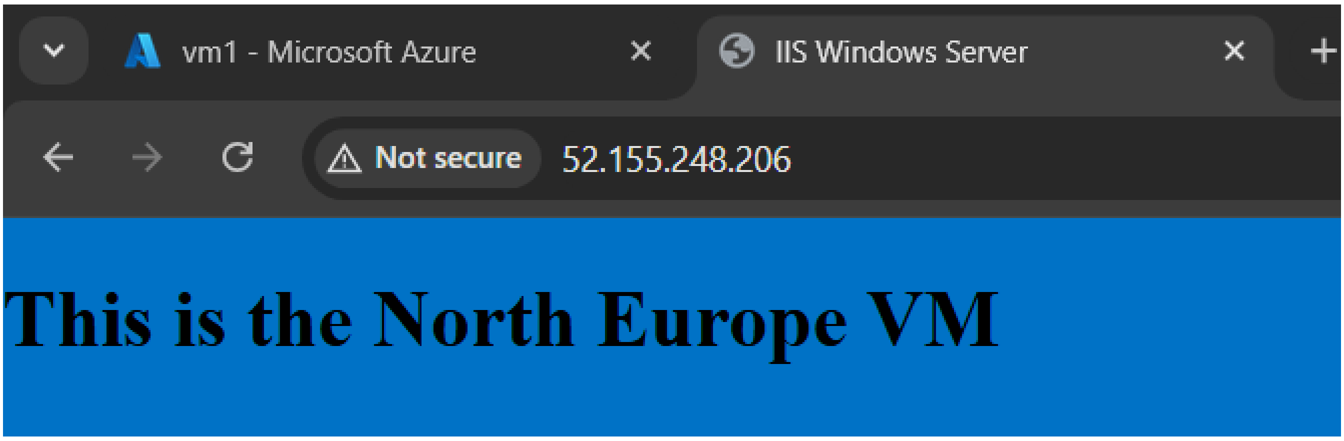
Virtual network/subnet : vm1-vnet/default

DNS name : Not configured

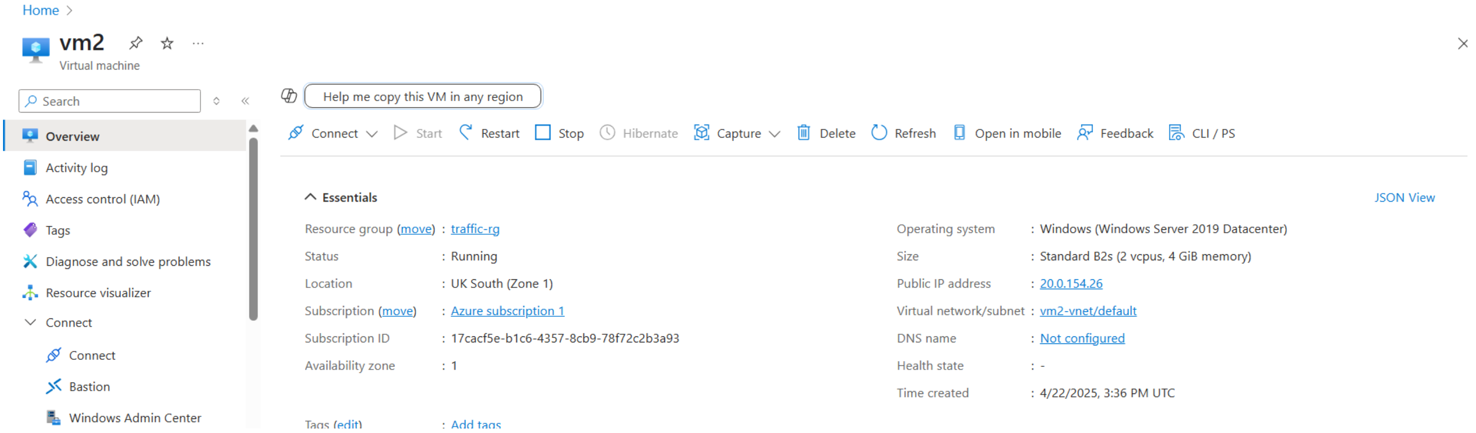
Health state : -

Time created : 4/22/2025, 3:35 PM UTC

Tags (edit) : Add tags



This is the North Europe VM



Essentials

Resource group (move) : traffic-rg

Status : Running

Location : UK South (Zone 1)

Subscription (move) : Azure subscription 1

Subscription ID : 17cacf5e-b1c6-4357-8cb9-78f72c2b3a93

Availability zone : 1

Operating system : Windows (Windows Server 2019 Datacenter)

Size : Standard B2s (2 vcpus, 4 GiB memory)

Public IP address : 20.0.154.26

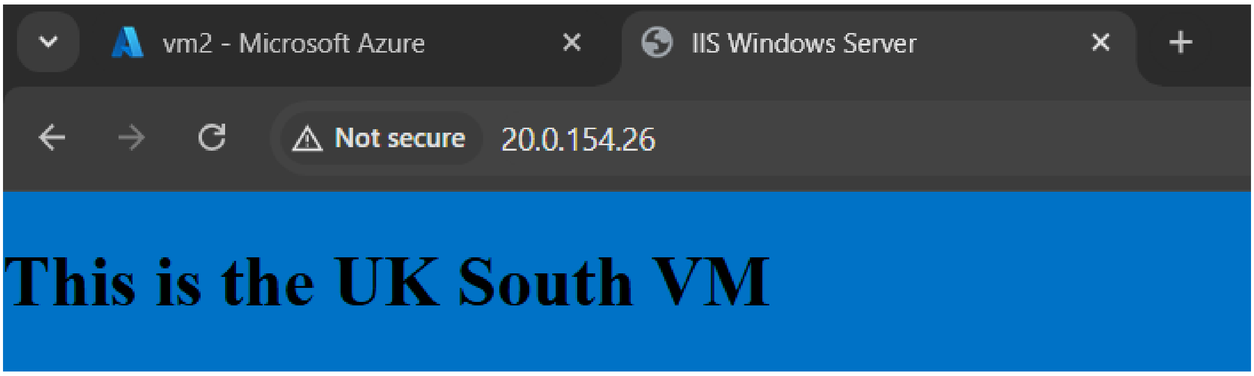
Virtual network/subnet : vm2-vnet/default

DNS name : Not configured

Health state : -

Time created : 4/22/2025, 3:36 PM UTC

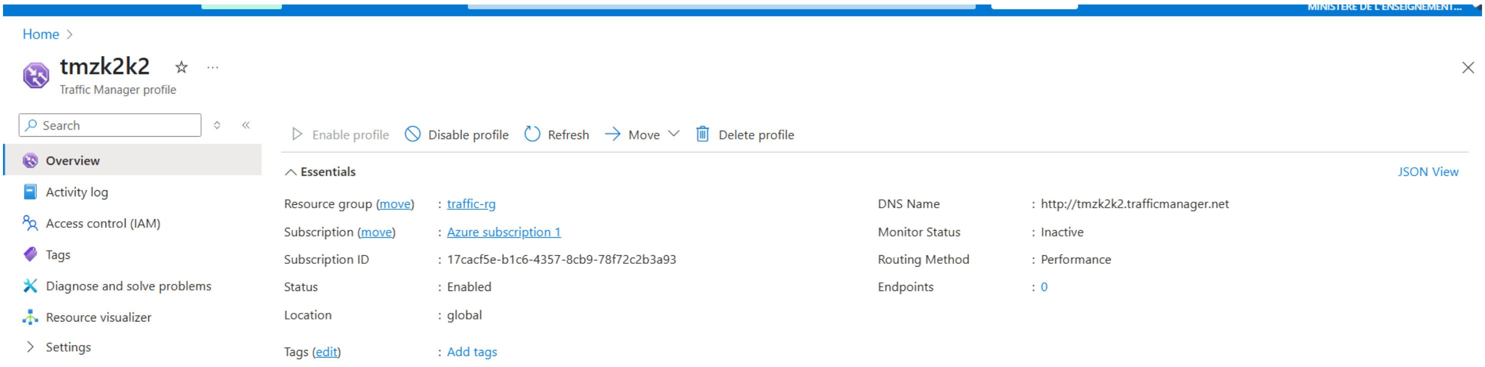
Tags (edit) : Add tags



This is the UK South VM

c/d/e. We created a **Traffic Manager profile with Geographic routing** to direct users to the closest Azure region — either **UK South** or **North Europe**. Inside **UK South**, we used a **nested Traffic Manager with Priority routing** to ensure high availability: if VM1 fails, traffic is automatically routed to VM2. All VMs were added as **External endpoints**.

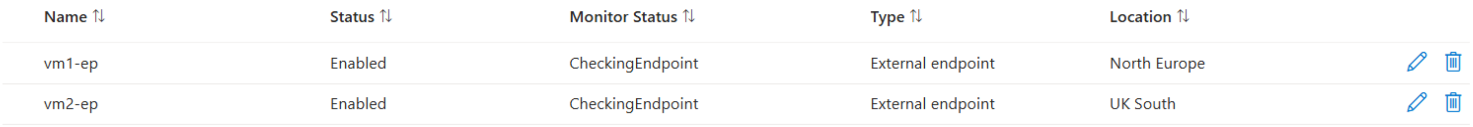
To test the setup, we used **Wireshark** to capture DNS responses from the Traffic Manager. By filtering for DNS packets, we observed that the DNS response includes **multiple IP addresses** (from the configured endpoints), and it's up to the client (usually the browser or OS) to choose which IP to connect to.



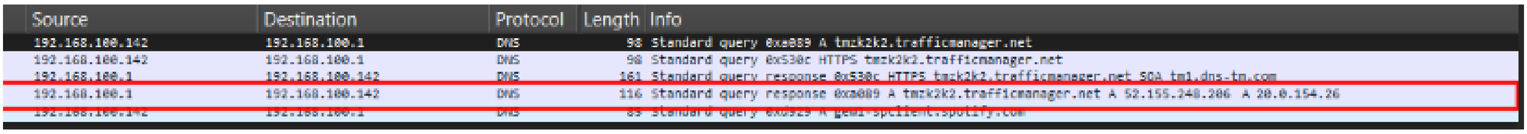
tmzk2k2
Traffic Manager profile

Resource group (move) : traffic-rg
Subscription (move) : Azure subscription 1
Subscription ID : 17cacf5e-b1c6-4357-8cb9-78f72c2b3a93
Status : Enabled
Location : global
Tags (edit) : Add tags

DNS Name : http://tmzk2k2.trafficmanager.net
Monitor Status : Inactive
Routing Method : Performance
Endpoints : 0

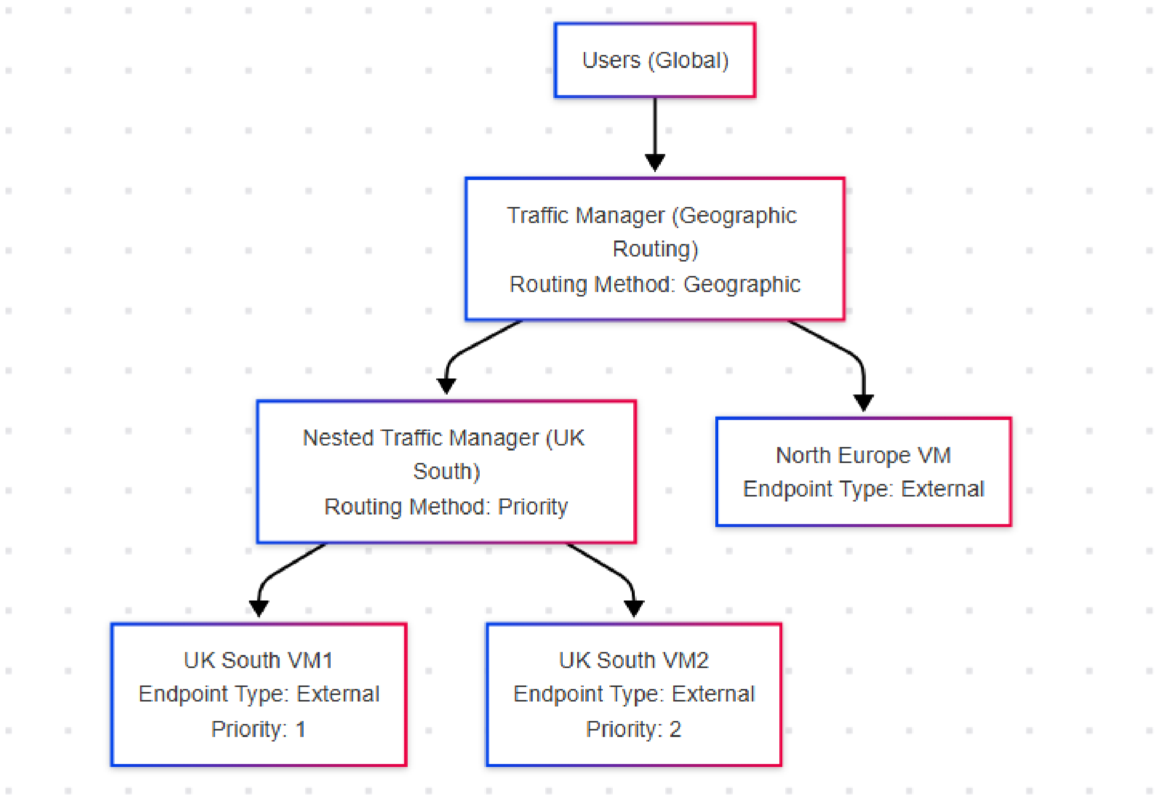


Name ⇅	Status ⇅	Monitor Status ⇅	Type ⇅	Location ⇅
vm1-ep	Enabled	CheckingEndpoint	External endpoint	North Europe
vm2-ep	Enabled	CheckingEndpoint	External endpoint	UK South



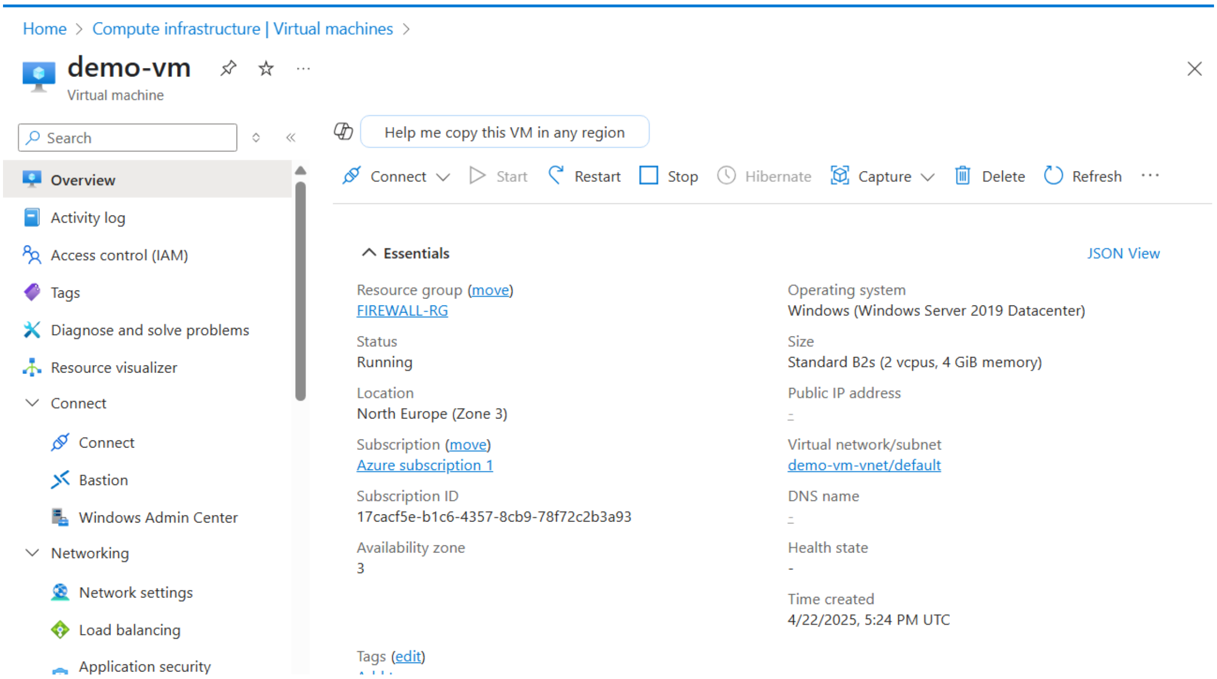
```
Source            Destination       Protocol  Length  Info
192.168.100.142   192.168.100.1     DNS           98  Standard query 0xa889 A tmzk2k2.trafficmanager.net
192.168.100.142   192.168.100.1     DNS           98  Standard query 0x530c HTTPS tmzk2k2.trafficmanager.net
192.168.100.1     192.168.100.142   DNS          161  Standard query response 0x530c HTTPS tmzk2k2.trafficmanager.net SOA tm1.dns-tm.com
192.168.100.1     192.168.100.142   DNS          116  Standard query response 0xa889 A tmzk2k2.trafficmanager.net A 52.155.248.206  A 20.0.154.26
192.168.100.142   192.168.100.1     DNS           85  Standard query 0x0929 A gew1-spclient.spotify.com
```

2. We designed a **geo-distributed architecture** using Azure Traffic Manager. A top-level **Traffic Manager with Geographic routing** directs users to either the **UK South** region or **North Europe**, depending on their physical location. Inside the UK South region, a **nested Traffic Manager profile** with **Priority routing** ensures high availability by directing traffic to **VM1** first, and to **VM2** only if VM1 becomes unavailable. All VMs are configured as **External endpoints**.



TASK 02

1. We deployed a VM named *demovm* in North Europe inside a new virtual network and subnet. This allows us to simulate an internal server with private access only, laying the groundwork for secure firewall routing.



Resource group (move)
FIREWALL-RG

Status
Running

Location
North Europe (Zone 3)

Subscription (move)
Azure subscription 1

Subscription ID
17cacf5e-b1c6-4357-8cb9-78f72c2b3a93

Availability zone
3

Tags (edit)

Operating system
Windows (Windows Server 2019 Datacenter)

Size
Standard B2s (2 vcpus, 4 GiB memory)

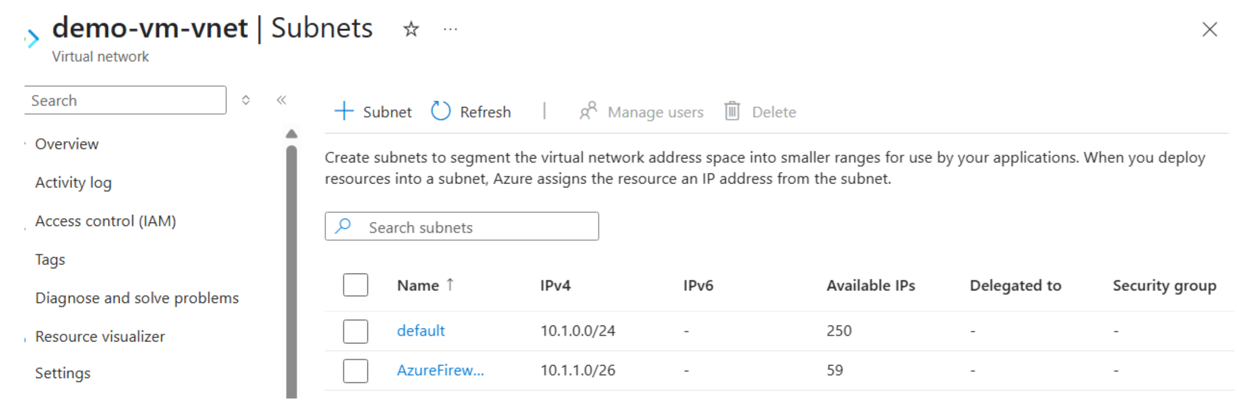
Public IP address
-

Virtual network/subnet
demo-vm-vnet/default

DNS name
-

Health state
-

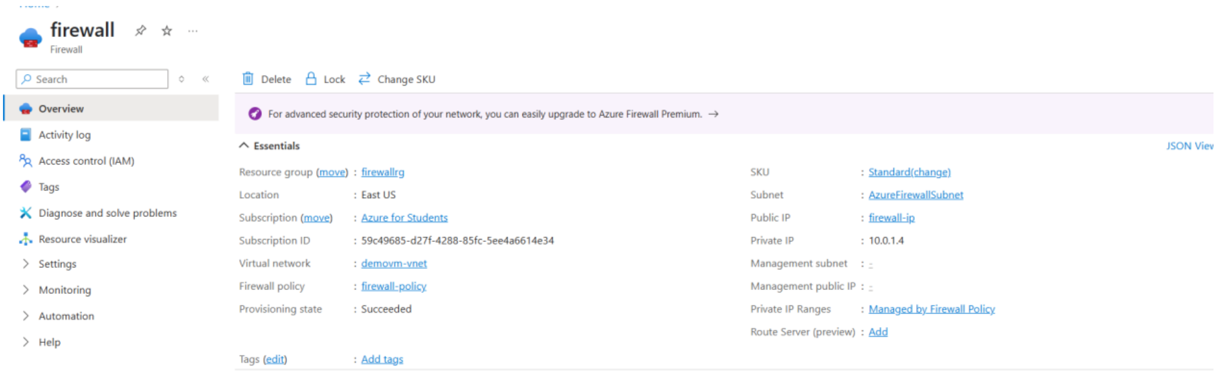
Time created
4/22/2025, 5:24 PM UTC



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

	Name ↑	IPv4	IPv6	Available IPs	Delegated to	Security group
□	default	10.1.0.0/24	-	250	-	-
□	AzureFirew...	10.1.1.0/26	-	59	-	-

2. We created an Azure Firewall with a static public IP and a new firewall policy. This allows us to manage network traffic centrally and apply rules to control connectivity.



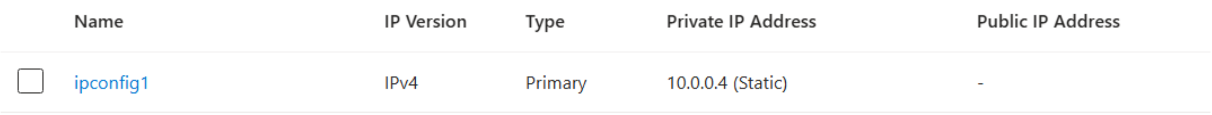
For advanced security protection of your network, you can easily upgrade to Azure Firewall Premium. →

Resource group (move) : firewallrg
Location : East US
Subscription (move) : Azure for Students
Subscription ID : 59c49685-d27f-4288-85fc-5ee4a6614e34
Virtual network : demovm-vnet
Firewall policy : firewall-policy
Provisioning state : Succeeded

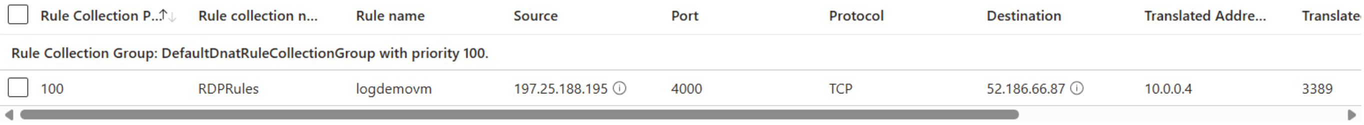
Tags (edit) : Add tags

SKU : Standard(change)
Subnet : AzureFirewallSubnet
Public IP : firewall-ip
Private IP : 10.0.1.4
Management subnet : -
Management public IP : -
Private IP Ranges : Managed by Firewall Policy
Route Server (preview) : Add

3. We added a DNAT rule to the firewall to allow RDP to *demovm* through port 4000. This allows us to securely reach the VM without assigning it a public IP, however we first had to set the demo VM's IP to static.

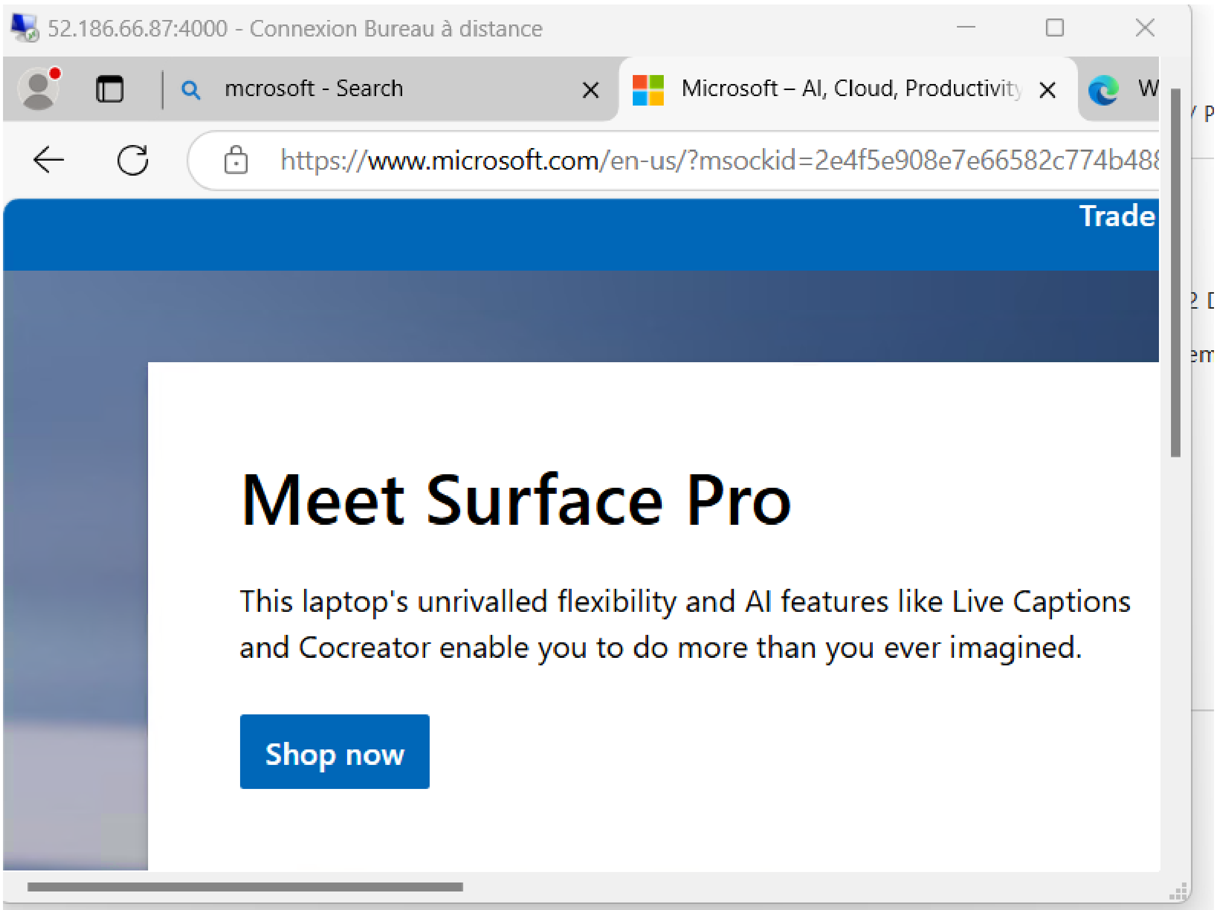


	Name	IP Version	Type	Private IP Address	Public IP Address
□	ipconfig1	IPv4	Primary	10.0.0.4 (Static)	-



□ Rule Collection P...	Rule collection n...	Rule name	Source	Port	Protocol	Destination	Translated Addre...	Translate
Rule Collection Group: DefaultDnatRuleCollectionGroup with priority 100.								
□ 100	RDPRules	logdemovm	197.25.188.195 ⓘ	4000	TCP	52.186.66.87 ⓘ	10.0.0.4	3389

4. We tested the DNAT rule by connecting to the firewall's public IP on port 4000. This allows us to verify that the traffic is correctly redirected to the VM's RDP port. **5.** We browsed the internet from *demovm* to confirm outbound access worked. This allows us to validate baseline connectivity before applying restrictions.



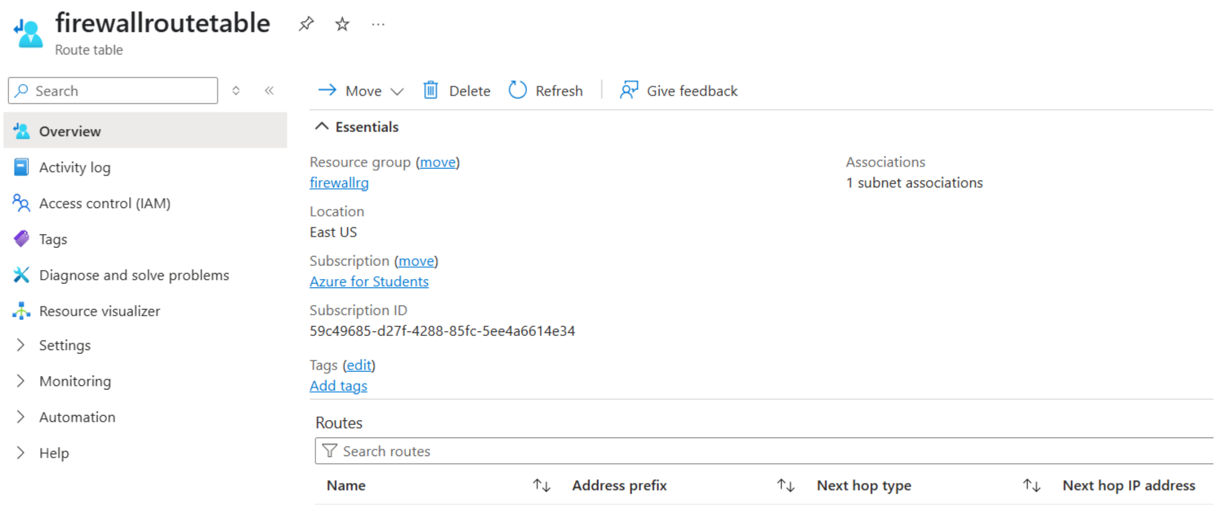
52.186.66.87:4000 - Connexion Bureau à distance

mcrosoft - Search
Microsoft – AI, Cloud, Productivity
W
https://www.microsoft.com/en-us/?msockid=2e4f5e908e7e66582c774b48
Trade

Meet Surface Pro

This laptop's unrivalled flexibility and AI features like Live Captions and Cocreator enable you to do more than you ever imagined.

6. We created a route table and associated it with the VM's subnet. This allows us to route all internet-bound traffic through the firewall.



Resource group (move)
firewallrg

Location
East US

Subscription (move)
Azure for Students

Subscription ID
59c49685-d27f-4288-85fc-5ee4a6614e34

Tags (edit)
Add tags

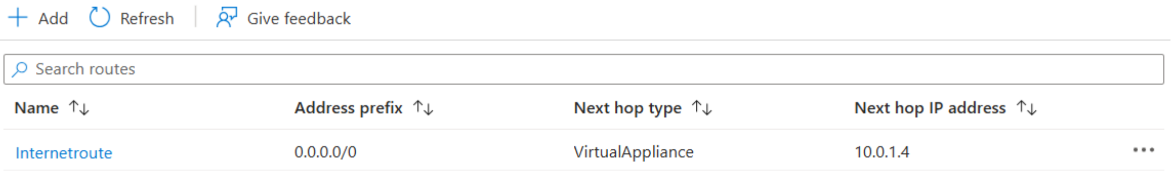
Associations
1 subnet associations

Routes

Search routes

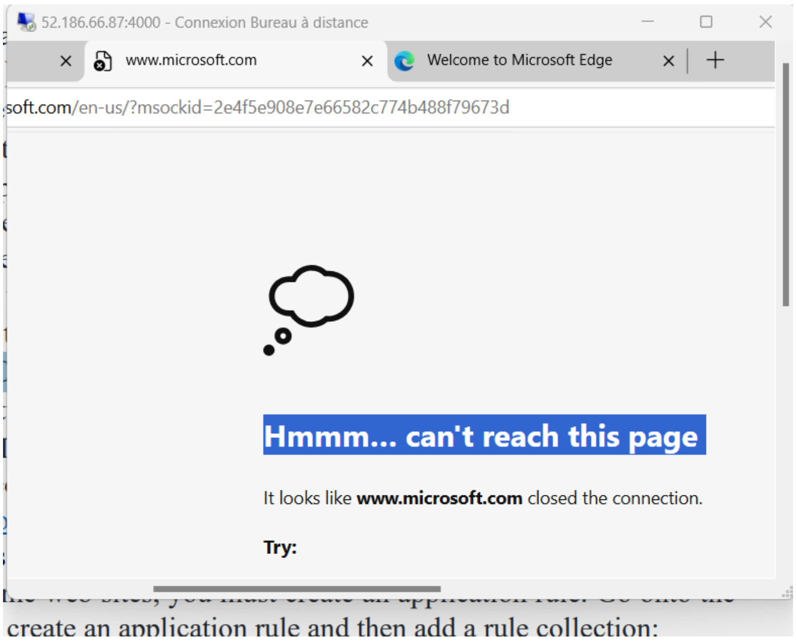
Name	Address prefix	Next hop type	Next hop IP address

7. We added a route to send 0.0.0.0/0 traffic to the firewall’s private IP. This allows us to control and inspect all outgoing traffic from the VM.



Name	Address prefix	Next hop type	Next hop IP address
Internetroute	0.0.0.0/0	VirtualAppliance	10.0.1.4

8. We tested access to www.microsoft.com again and found it blocked. This allows us to confirm that firewall routing and default deny behavior is in place.


52.186.66.87:4000 - Connexion Bureau à distance
www.microsoft.com
Welcome to Microsoft Edge

soft.com/en-us/?msockid=2e4f5e908e7e66582c774b488f79673d

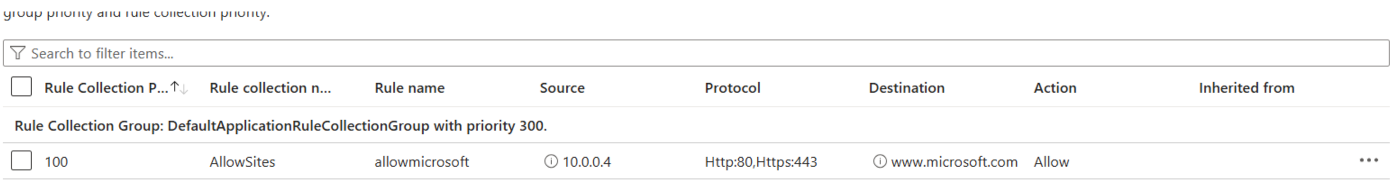
Hmmm... can't reach this page

It looks like **www.microsoft.com** closed the connection.

Try:

create an application rule and then add a rule collection:

9. We created an application rule in the firewall policy to allow www.microsoft.com. This allows us to whitelist specific domains while maintaining control over other traffic.

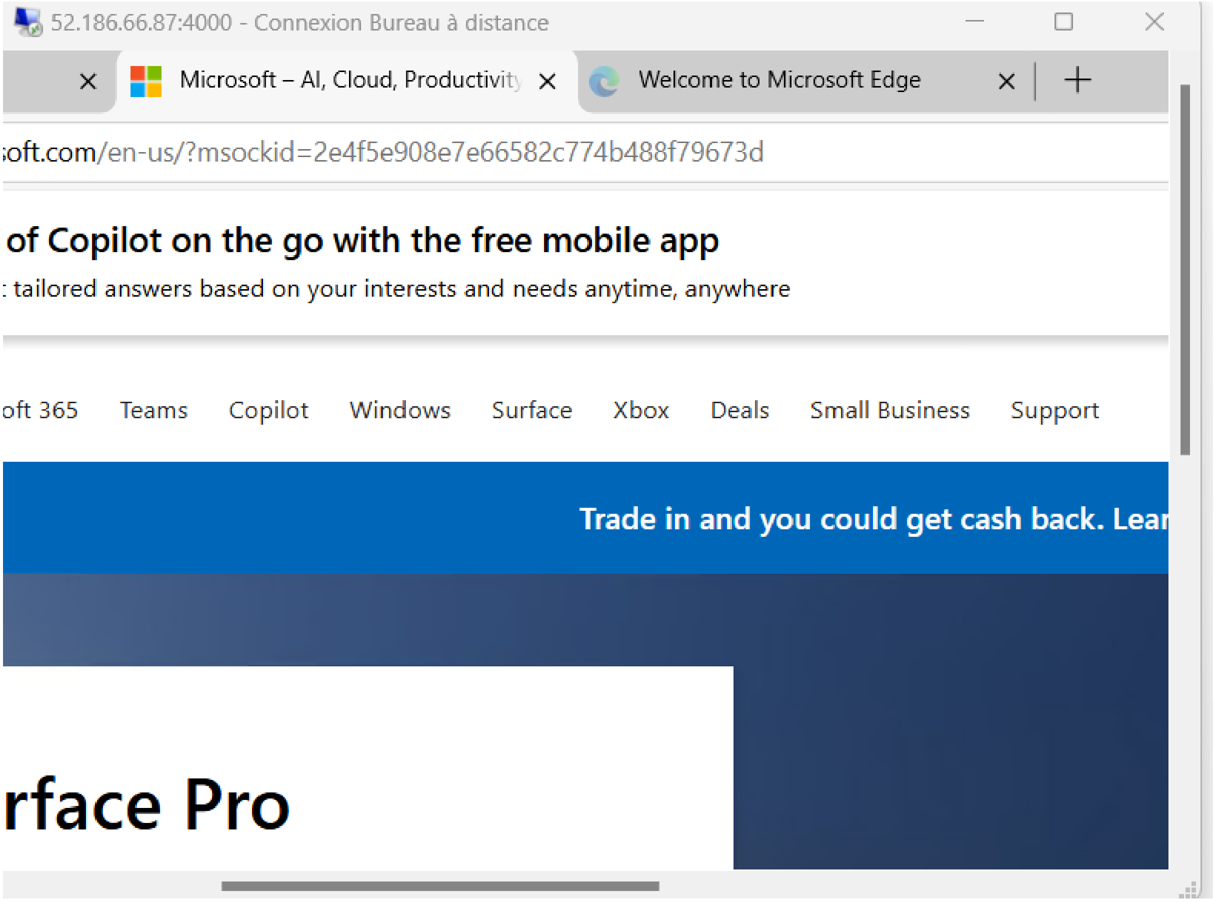


group priority and rule collection priority.

Search to filter items...

□	Rule Collection P...↑↓	Rule collection n...	Rule name	Source	Protocol	Destination	Action	Inherited from
Rule Collection Group: DefaultApplicationRuleCollectionGroup with priority 300.								
□	100	AllowSites	allowmicrosoft	ⓘ 10.0.0.4	Http:80,Https:443	ⓘ www.microsoft.com	Allow	···

10. We tested the browser again and were able to reach www.microsoft.com. This confirms the rule is working and traffic is being filtered as expected.



52.186.66.87:4000 - Connexion Bureau à distance

Microsoft – AI, Cloud, Productivity
Welcome to Microsoft Edge

soft.com/en-us/?msockid=2e4f5e908e7e66582c774b488f79673d

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: tailored answers based on your interests and needs anytime, anywhere

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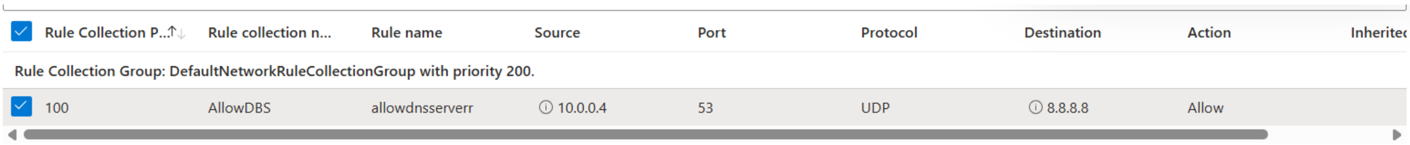
Copilot
Windows
Surface
Xbox
Deals
Small Business
Support
Trade in and you could get cash back. Lear
rface Pro

11. We added a network rule to allow DNS access to 8.8.8.8. This allows us to ensure name resolution works for the VM under firewall control.

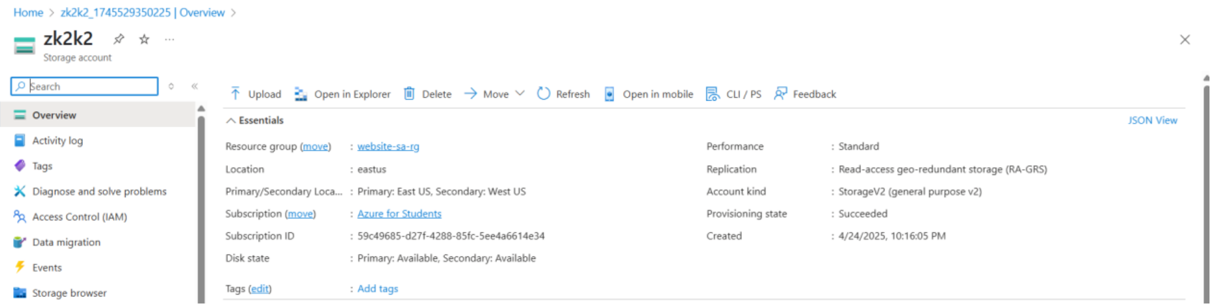


☑	Rule Collection P...↑↓	Rule collection n...	Rule name	Source	Port	Protocol	Destination	Action	Inheritec
Rule Collection Group: DefaultNetworkRuleCollectionGroup with priority 200.									
☑	100	AllowDBS	allowdnsserverr	ⓘ 10.0.0.4	53	UDP	ⓘ 8.8.8.8	Allow	

12. We deleted the firewall RG.

TASK 03

1.We created a storage account in the website-sa-rg resource group. This allows us to use Azure Storage as a web host for static content.



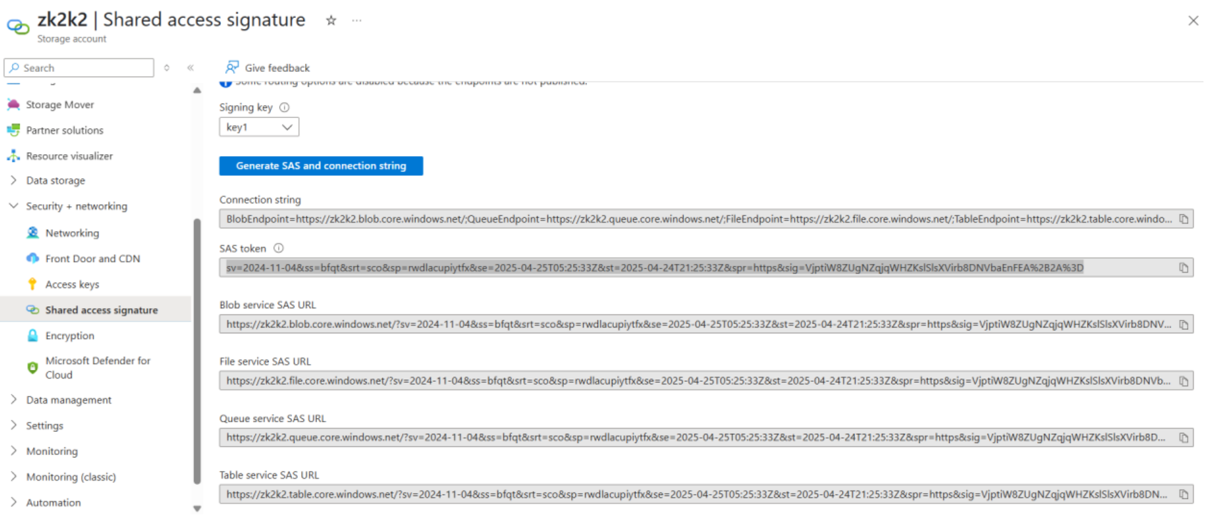
Home > zk2k2_1745529350225 | Overview >

zk2k2
Storage account

Resource group (move) : website-sa-rg
Location : eastus
Primary/Secondary Loca... : Primary: East US, Secondary: West US
Subscription (move) : Azure for Students
Subscription ID : 59c49685-d27f-4288-85fc-5ee4a6614e34
Disk state : Primary: Available, Secondary: Available
Tags (edit) : Add tags

Performance : Standard
Replication : Read-access geo-redundant storage (RA-GRS)
Account kind : StorageV2 (general purpose v2)
Provisioning state : Succeeded
Created : 4/24/2025, 10:16:05 PM

2. We enabled static website hosting in the storage account and set *index.html* as the default document. This allows us to serve web content publicly via a generated endp



zk2k2 | Shared access signature
Storage account

Signing key: key1

Connection string
```
BlobEndpoint=https://zk2k2.blob.core.windows.net/;QueueEndpoint=https://zk2k2.queue.core.windows.net/;FileEndpoint=https://zk2k2.file.core.windows.net/;TableEndpoint=https://zk2k2.table.core.windo...
```

SAS token
```
sv=2024-11-04&ss=bfqt&srt=sco&sp=rwdlacupiytfx&se=2025-04-25T05:25:33Z&st=2025-04-24T21:25:33Z&spr=https&sig=VjptiW8ZUgNZqjqWHZKslSlsXVirb8DNVbaEnFEA%2B2A%3D
```

Blob service SAS URL
```
https://zk2k2.blob.core.windows.net/?sv=2024-11-04&ss=bfqt&srt=sco&sp=rwdlacupiytfx&se=2025-04-25T05:25:33Z&st=2025-04-24T21:25:33Z&spr=https&sig=VjptiW8ZUgNZqjqWHZKslSlsXVirb8DNV...
```

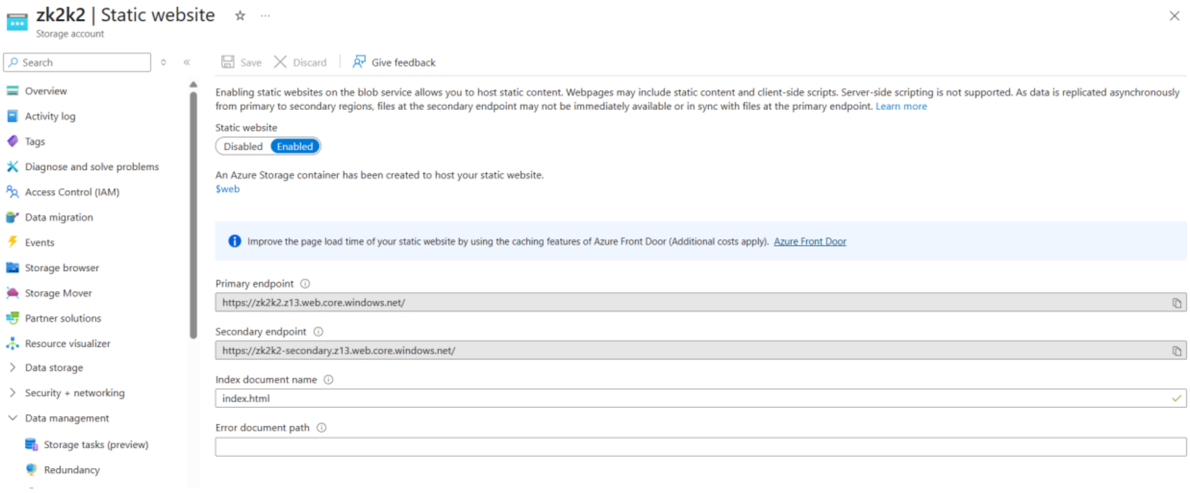
File service SAS URL
```
https://zk2k2.file.core.windows.net/?sv=2024-11-04&ss=bfqt&srt=sco&sp=rwdlacupiytfx&se=2025-04-25T05:25:33Z&st=2025-04-24T21:25:33Z&spr=https&sig=VjptiW8ZUgNZqjqWHZKslSlsXVirb8DNVb...
```

Queue service SAS URL
```
https://zk2k2.queue.core.windows.net/?sv=2024-11-04&ss=bfqt&srt=sco&sp=rwdlacupiytfx&se=2025-04-25T05:25:33Z&st=2025-04-24T21:25:33Z&spr=https&sig=VjptiW8ZUgNZqjqWHZKslSlsXVirb8D...
```

Table service SAS URL
```
https://zk2k2.table.core.windows.net/?sv=2024-11-04&ss=bfqt&srt=sco&sp=rwdlacupiytfx&se=2025-04-25T05:25:33Z&st=2025-04-24T21:25:33Z&spr=https&sig=VjptiW8ZUgNZqjqWHZKslSlsXVirb8DN...
```

3. We confirmed that the $web container was created automatically. This allows us to store and organize website files for hosting

4. We generated a SAS token from the storage account. This allows us to securely upload content to the container without full account access.



zk2k2 | Static website

Storage account

Enabling static websites on the blob service allows you to host static content. Webpages may include static content and client-side scripts. Server-side scripting is not supported. As data is replicated asynchronously from primary to secondary regions, files at the secondary endpoint may not be immediately available or in sync with files at the primary endpoint. Learn more

Static website: Disabled [✓ Enabled]

An Azure Storage container has been created to host your static website.
$web

Improve the page load time of your static website by using the caching features of Azure Front Door (Additional costs apply). Azure Front Door

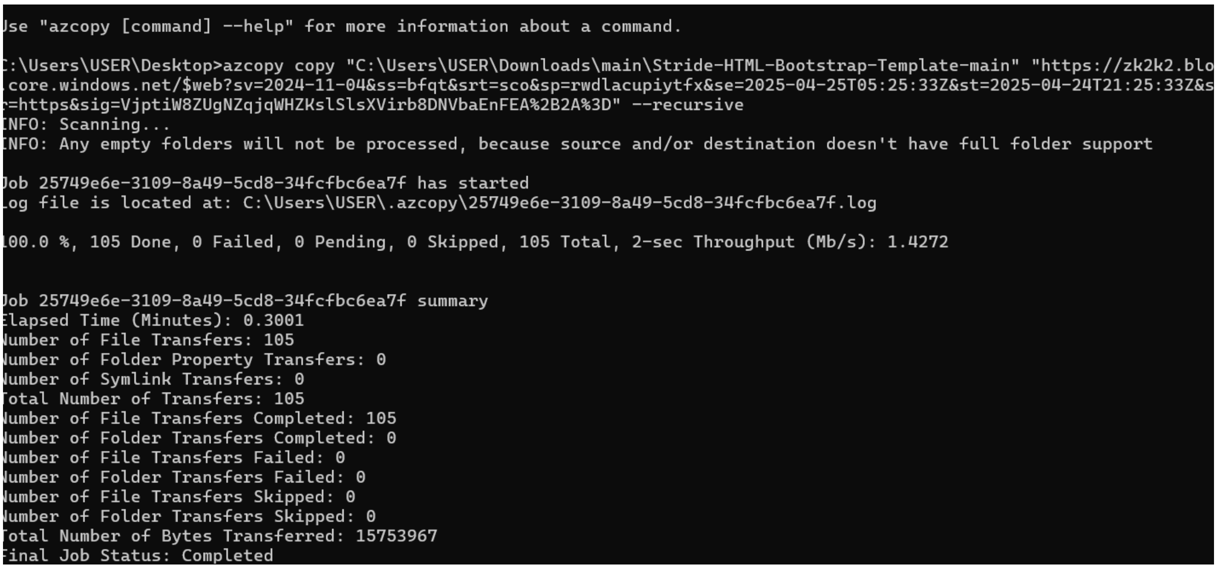
Primary endpoint: https://zk2k2.z13.web.core.windows.net/

Secondary endpoint: https://zk2k2-secondary.z13.web.core.windows.net/

Index document name: index.html

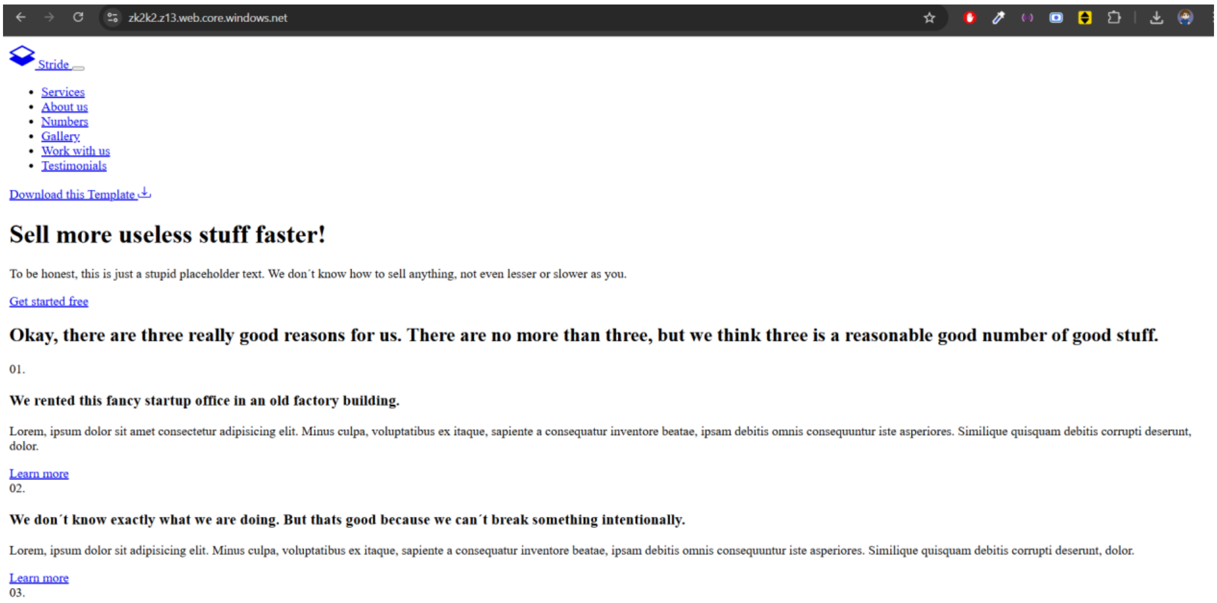
Error document path:

5. We used AzCopy to upload the website files from our local PC to the $web container. This allows us to automate and efficiently transfer site content to the cloud.



```
Jse "azcopy [command] --help" for more information about a command.

:\Users\USER\Desktop>azcopy copy "C:\Users\USER\Downloads\main\Stride-HTML-Bootstrap-Template-main" "https://zk2k2.blo
.core.windows.net/$web?sv=2024-11-04&ss=bfqt&srt=sco&sp=rwdlacupiytfx&se=2025-04-25T05:25:33Z&st=2025-04-24T21:25:33Z&s
=https&sig=VjptiW8ZUgNZqjqWHZKslSlsXVirb8DNVbaEnFEA%2B2A%3D" --recursive
INFO: Scanning...
INFO: Any empty folders will not be processed, because source and/or destination doesn't have full folder support

Job 25749e6e-3109-8a49-5cd8-34fcfbc6ea7f has started
.og file is located at: C:\Users\USER\.azcopy\25749e6e-3109-8a49-5cd8-34fcfbc6ea7f.log

00.0 %, 105 Done, 0 Failed, 0 Pending, 0 Skipped, 105 Total, 2-sec Throughput (Mb/s): 1.4272


Job 25749e6e-3109-8a49-5cd8-34fcfbc6ea7f summary
Elapsed Time (Minutes): 0.3001
Number of File Transfers: 105
Number of Folder Property Transfers: 0
Number of Symlink Transfers: 0
Total Number of Transfers: 105
Number of File Transfers Completed: 105
Number of Folder Transfers Completed: 0
Number of File Transfers Failed: 0
Number of Folder Transfers Failed: 0
Number of File Transfers Skipped: 0
Number of Folder Transfers Skipped: 0
Total Number of Bytes Transferred: 15753967
Final Job Status: Completed
```

6. We accessed the primary endpoint in a browser to view the website. This allows us to confirm the static site is live and serving content as expected.



zk2k2.z13.web.core.windows.net

Stride

- Services
- About us
- Numbers
- Gallery
- Work with us
- Testimonials

Download this Template

Sell more useless stuff faster!

To be honest, this is just a stupid placeholder text. We don´t know how to sell anything, not even lesser or slower as you.

Get started free

Okay, there are three really good reasons for us. There are no more than three, but we think three is a reasonable good number of good stuff.

01.

We rented this fancy startup office in an old factory building.

Lorem, ipsum dolor sit amet consectetur adipisicing elit. Minus culpa, voluptatibus ex itaque, sapiente a consequatur inventore beatae, ipsam debitis omnis consequuntur iste asperiores. Similique quisquam debitis corrupti deserunt, dolor.

Learn more
02.

We don´t know exactly what we are doing. But thats good because we can´t break something intentionally.

Lorem, ipsum dolor sit adipisicing elit. Minus culpa, voluptatibus ex itaque, sapiente a consequatur inventore beatae, ipsam debitis omnis consequuntur iste asperiores. Similique quisquam debitis corrupti deserunt, dolor.

Learn more
03.

7. We deleted the *website-sa-rg* resource group. This allows us to remove all associated resources and stop billing.

Conclusion:

We set up a full Azure environment integrating Traffic Manager, Firewall, and Storage services to simulate real-world cloud infrastructure scenarios. This allows us to understand how to manage global traffic distribution, secure virtual networks, and host static web content using Azure-native tools. Overall, the lab demonstrated how different Azure services work together to deliver high availability, network security, and scalable web hosting.