

COURSE: CLOUD AND NETWORK SECURITY

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**NETWORK SECURITY GROUPS AND APPLICATION SECURITY
GROUPS**

Table of contents

Introduction	3
Exercise 1: Create the virtual networking infrastructure	4
Task 1: Create a virtual network with one subnet	4
Task 2: Create application security groups	4
Task 3: Create a network security group and associate the NSG to the subnet.....	5
Task 4: Create inbound NSG security rules to all traffic to web servers and RDP to the servers.....	6
Exercise 2: Deploy virtual machines and test network filters.....	7
Task 1: Create a virtual machine to use as a web server.	7
Task 2: Create a virtual machine to use as a management server.	8
Task 3: Associate each virtual machines network interface to its application security group.	8
Task 4: Test the network traffic filtering.....	10
Clean up resources.....	12
Conclusion.....	13

Introduction

This lab focused on implementing Azure Network Security Groups (NSGs) and Application Security Groups (ASGs) to control and test inbound and outbound traffic to virtual machines deployed within a virtual network. I deployed two VMs (myVMWeb and myVMMgmt) across different subnets and assigned each to a specific ASG—WebASG and MgmtASG. The goal was to ensure that only HTTP (port 80) traffic could reach the web server from the internet, and RDP (port 3389) access was limited to the management server. I configured NSG rules targeting these ASGs to simulate real-world security segmentation. The test included accessing the web server via its public IP and validating successful or blocked traffic based on the rule sets applied. The lab provided practical experience with scoped security controls in a cloud environment, aligning with best practices for least privilege access and network isolation.

Exercise 1: Create the virtual networking infrastructure

Task 1: Create a virtual network with one subnet.

Refresh (Ctrl+R) Microsoft Azure Upgrade Search resources, services, and docs (G+)

Home > myVirtualNetwork-1753702736657 | Overview

Search

Overview

Inputs

Outputs

Template

✓ Your deployment is complete

Deployment name : myVirtualNetwork-1753702736657 Start time : 7/28/2025, 2:39:10 PM

Subscription : Azure subscription 1 Correlation ID : d43a4b74-0233-408b-9c61-3764...

Resource group : AZ500LAB07

Deployment details

Next steps

Go to resource

Give feedback

Tell us about your experience with deployment

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2:39 PM 7/28/2025

Task 2: Create application security groups

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

Home > Network foundation | Application security groups >

myAsgWebServers Application security group

Show me metrics for this Application Security Group. How do I troubleshoot issues with this resource? +1

Search

Move Delete

Overview

Activity log

Access control (IAM)

Tags

Resource visualizer

Settings

Monitoring

Automation

Help

Essentials

Resource group (move) : AZ500LAB07

Location : East US

Subscription (move) : Azure subscription 1

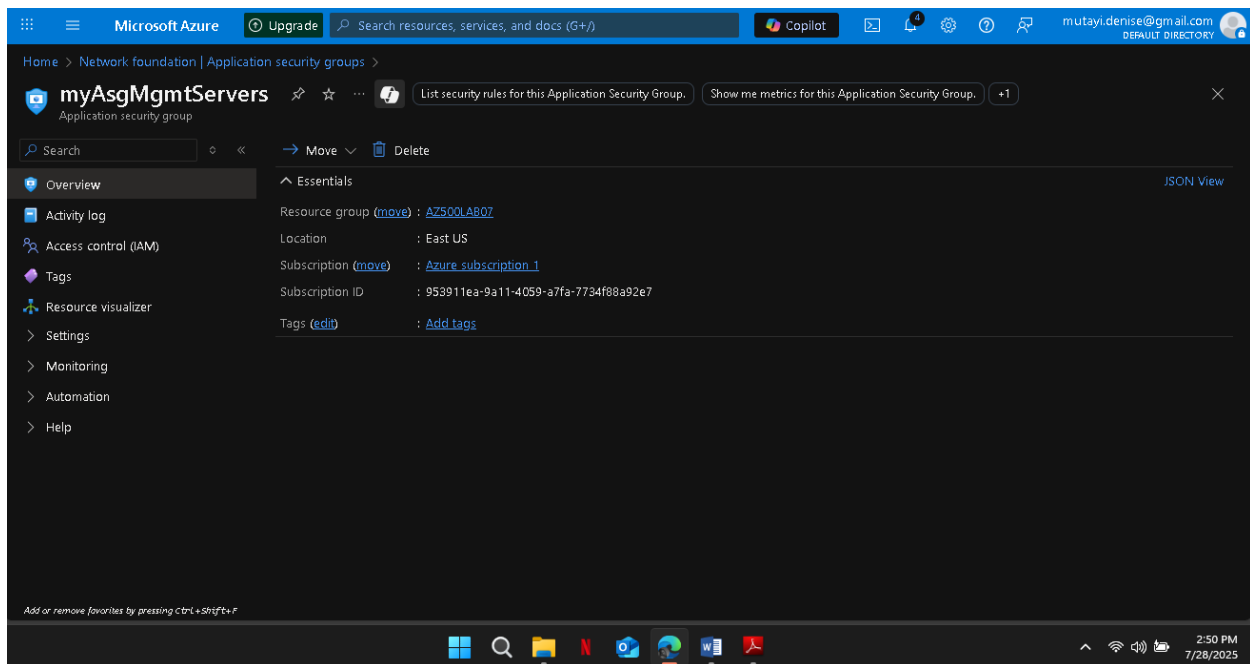
Subscription ID : 953911ea-9a11-4059-a7fa-7734f88a92e7

Tags (edit) : Add tags

JSON View

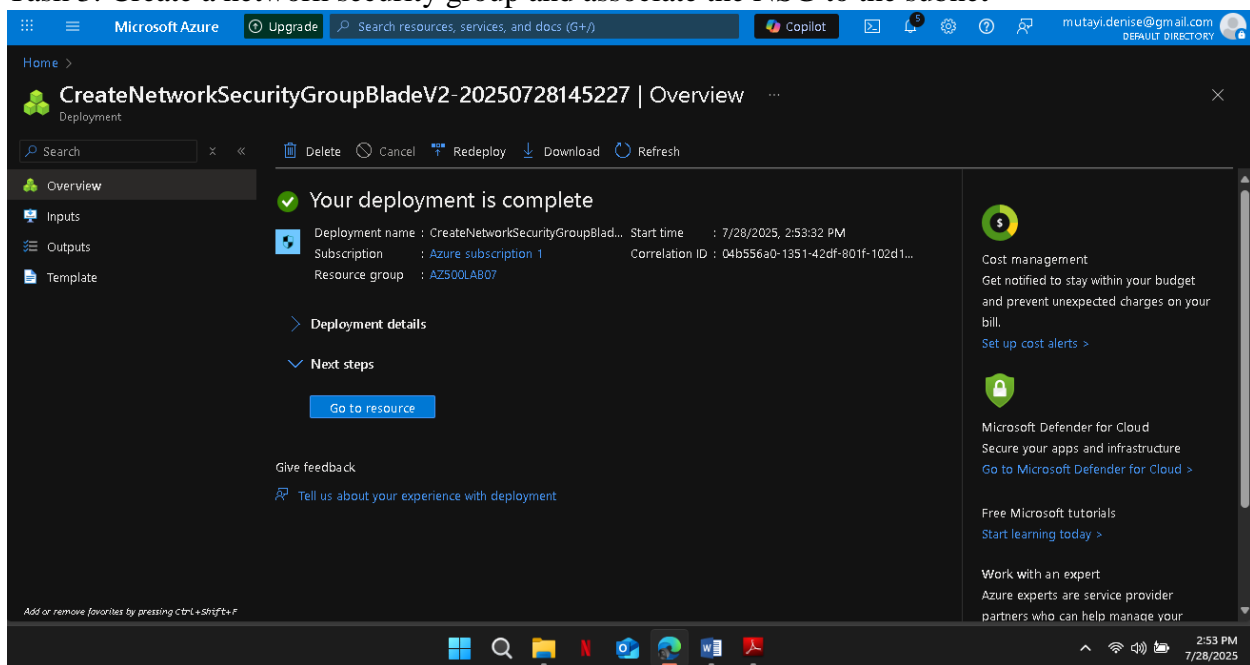
2:49 PM 7/28/2025

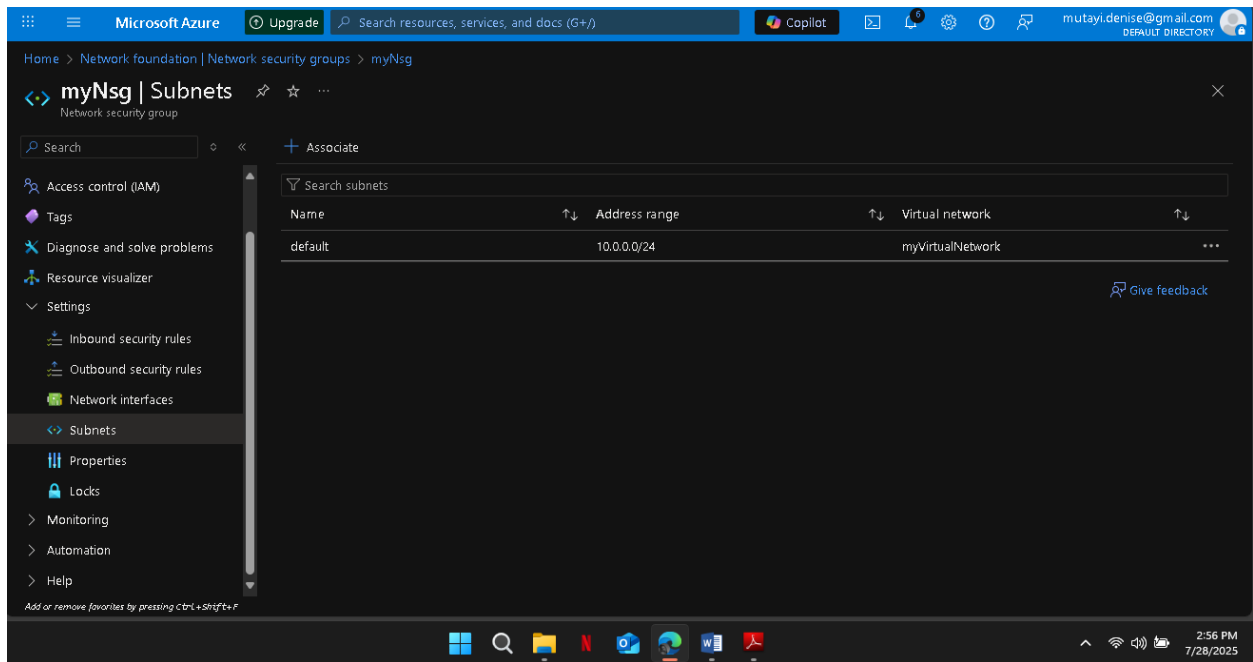
This group will be for the web servers



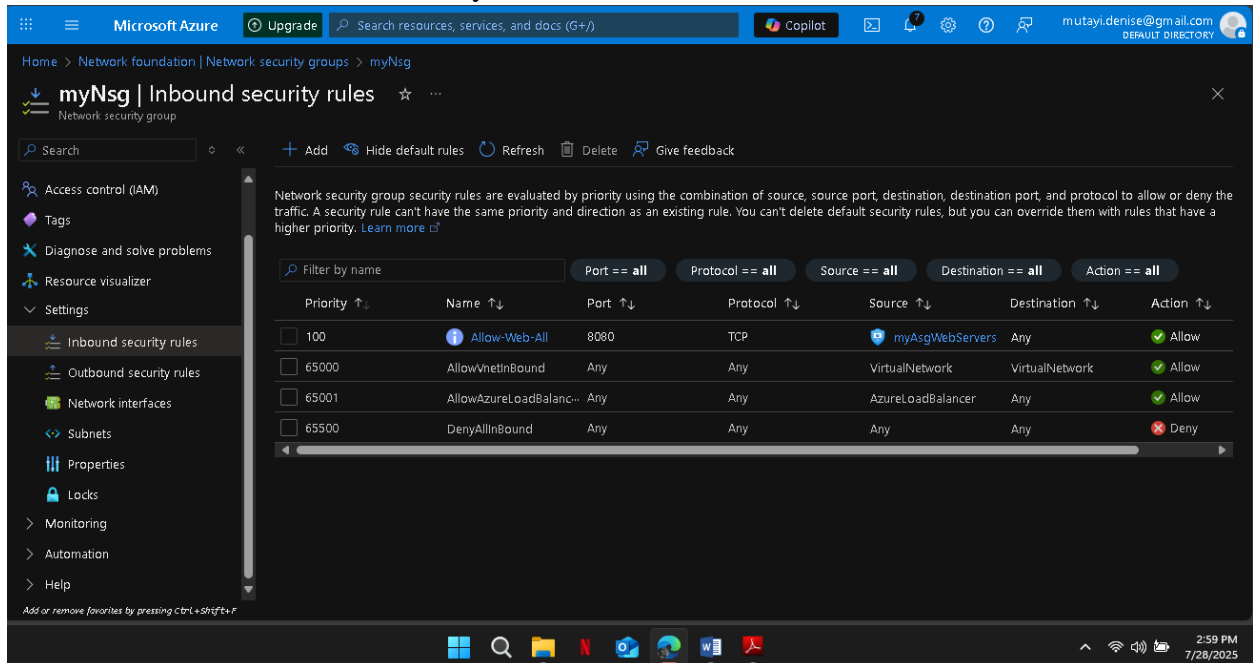
This group will be for the management servers

Task 3: Create a network security group and associate the NSG to the subnet





Task 4: Create inbound NSG security rules to all traffic to web servers and RDP to the servers.



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

Home > Network foundation | Network security groups > myNsg

myNsg | Inbound security rules

Network security group

Search | Add | Hide default rules | Refresh | Delete | Give feedback

Access control (IAM) | Tags | Diagnose and solve problems | Resource visualizer | Settings | Inbound security rules | Outbound security rules | Network interfaces | Subnets | Properties | Locks | Monitoring | Automation | Help

Network security group security rules are evaluated by priority using the combination of source, source port, destination, destination port, and protocol to allow or deny the traffic. A security rule can't have the same priority and direction as an existing rule. You can't delete default security rules, but you can override them with rules that have a higher priority. [Learn more](#)

Filter by name | Port == all | Protocol == all | Source == all | Destination == all | Action == all

Priority	Name	Port	Protocol	Source	Destination	Action
100	Allow-Web-All	8080	TCP	myAsgWebServers	Any	Allow
110	Allow-RDP-All	8080	TCP	myAsgMgmtServ...	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalanc...	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

3:01 PM 7/28/2025

Exercise 2: Deploy virtual machines and test network filters

Task 1: Create a virtual machine to use as a web server.

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

Home > CreateVm-MicrosoftWindowsServer.WindowsServer-202-20250728154510 | Overview

Deployment

Search | Delete | Cancel | Redeploy | Download | Refresh

Overview | Inputs | Outputs | Template

Your deployment is complete

Deployment name: CreateVm-MicrosoftWindowsServer.Wind... Start time: 7/28/2025, 3:47:39 PM
Subscription: Azure subscription 1 Correlation ID: 0767eda3-d2d5-4958-ac40
Resource group: AZS00LAB07

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

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Task 2: Create a virtual machine to use as a management server.

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes the Microsoft Azure logo, a search bar, and a Copilot button. The user's email 'mutayi.denise@gmail.com' and 'DEFAULT DIRECTORY' are visible in the top right. The main content area displays the 'Overview' page for a virtual machine named 'myVMMgmt'. The left sidebar contains a navigation menu with options like 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', 'Diagnose and solve problems', 'Resource visualizer', 'Connect', 'Networking', 'Settings', 'Availability + scale', 'Security', 'Backup + disaster recovery', 'Operations', and 'Monitoring'. The main content area shows the 'Essentials' section with various properties:

- Resource group: [AZ500LAB07](#)
- Status: Running
- Location: East US
- Subscription: [Azure subscription 1](#)
- Subscription ID: 953911ea-9a11-4059-a7fa-7734f88a92e7
- Operating system: Windows (Windows Server 2022 Datacenter Azure Edition)
- Size: Standard D2s v3 (2 vcpus, 8 GiB memory)
- Public IP address: [74.235.237.248](#)
- Virtual network/subnet: [myVirtualNetwork/default](#)
- DNS name: [Not configured](#)
- Health state: -
- Time created: 7/28/2025, 12:55 PM UTC

At the bottom, there are tabs for 'Properties', 'Monitoring', 'Capabilities (8)', 'Recommendations', and 'Tutorials'. The Windows taskbar is visible at the bottom of the screen.

Task 3: Associate each virtual machines network interface to its application security group.

The screenshot shows the Microsoft Azure portal interface. The top navigation bar is the same as in Task 2. The main content area displays the 'Virtual machines' page under the 'Compute infrastructure' section. The left sidebar shows a navigation menu with options like 'Overview', 'All resources', 'Infrastructure', 'Virtual machines', 'Virtual Machine Scale Set (VMSS)', 'Compute Fleet', 'Disks + images', 'Custom images', 'Disks', 'Snapshots', 'Disk encryption sets', 'Capacity + placement', 'Related services', and 'Help'. The main content area shows a list of virtual machines with the following columns: Name, Subscription, Resource Group, Location, Status, Operating sys..., Size, and PL. The list contains two virtual machines:

Name	Subscription	Resource Group	Location	Status	Operating sys...	Size	PL
myVMMgmt	Azure subscript...	AZ500LAB07	East US	Running	Windows	Standard_D2s_v3	74
myVmWeb	Azure subscript...	AZ500LAB07	East US	Running	Windows	Standard_D2s_v3	74

At the bottom, there is a 'Showing 1 - 2 of 2. Display count: auto' indicator and a 'Give feedback' button. The Windows taskbar is visible at the bottom of the screen.

Both are running

Microsoft Azure

Search resources, services, and docs (G+)

Copilot

mutayi.denise@gmail.com
DEFAULT DIRECTORY

Home > Compute infrastructure | Virtual machines > myVMMgmt

myVMMgmt | Application security groups

Virtual machine

Search

This is a new experience. [Please provide feedback](#)

+ Add application security groups X Remove Refresh Give feedback

Network interface / IP configuration
myvmgmt294 (primary) / ipconfig1 (primary)

Name	Resource group
myAsgMgmtServers	AZS00LAB07

Overview
Activity log
Access control (IAM)
Tags
Diagnose and solve problems
Resource visualizer
Connect
Networking
Network settings
Load balancing
Application security groups
Network manager
Settings
Availability + scale

Add or remove favorites by pressing Ctrl+Shift+F

4:03 PM
7/28/2025

Microsoft Azure

Search resources, services, and docs (G+)

Copilot

mutayi.denise@gmail.com
DEFAULT DIRECTORY

Home > Compute infrastructure | Virtual machines > myVmWeb

myVmWeb | Application security groups

Virtual machine

Search

This is a new experience. [Please provide feedback](#)

+ Add application security groups X Remove Refresh Give feedback

Network interface / IP configuration
myvmweb835 (primary) / ipconfig1 (primary)

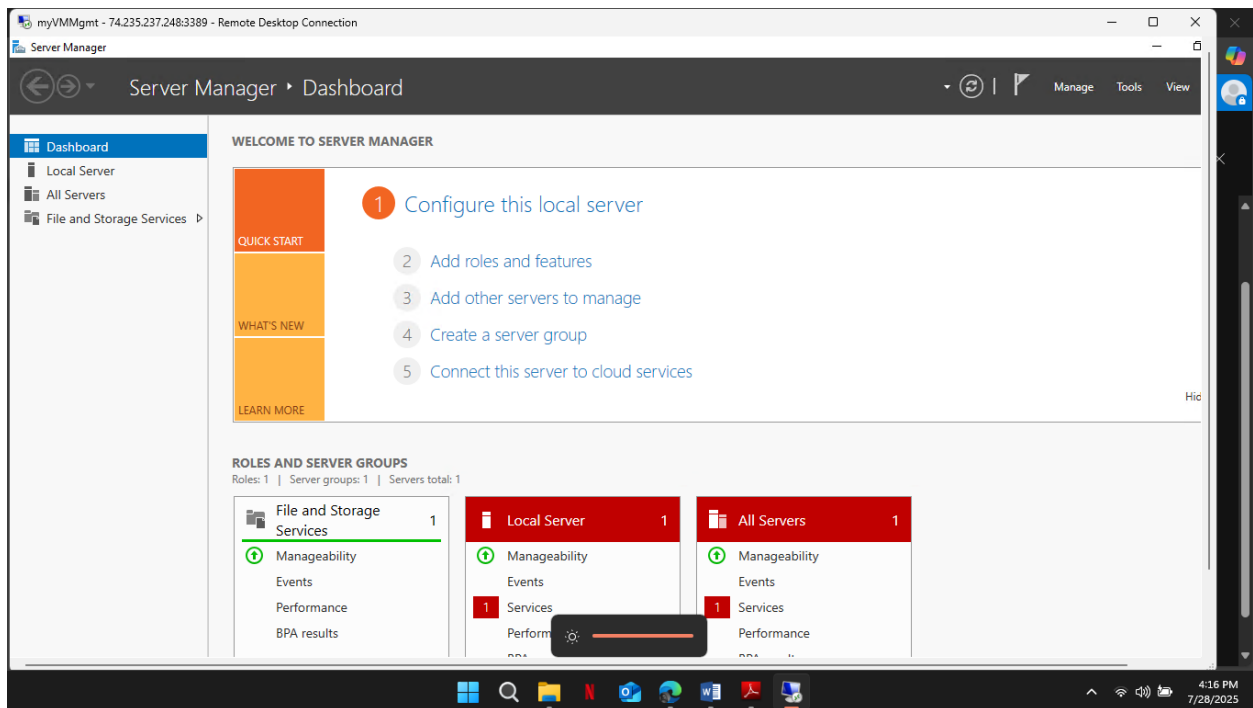
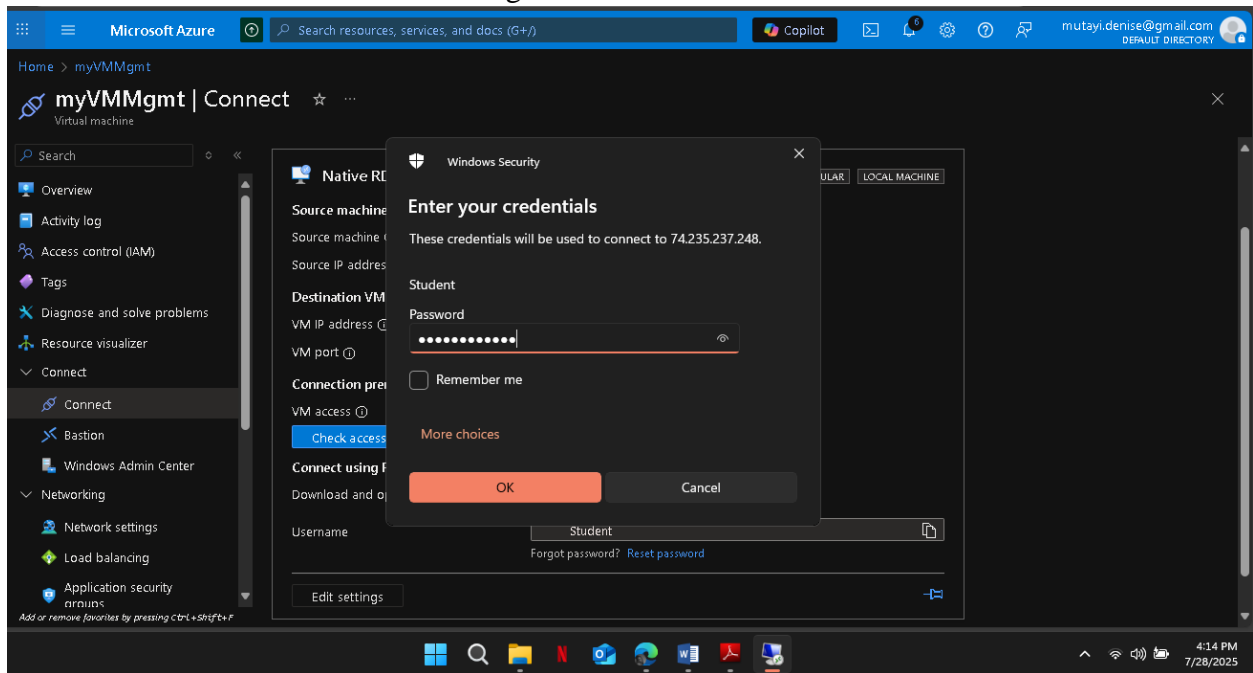
Name	Resource group
myAsgWebServers	AZS00LAB07

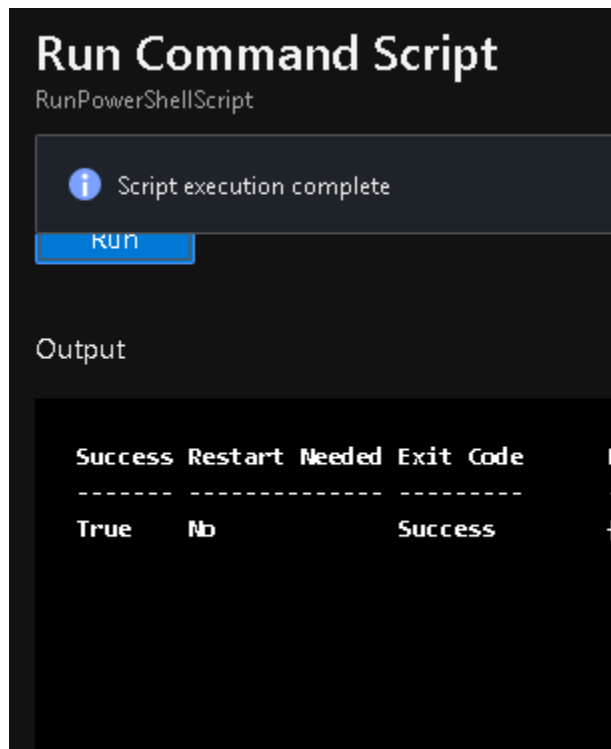
Overview
Activity log
Access control (IAM)
Tags
Diagnose and solve problems
Resource visualizer
Connect
Networking
Network settings
Load balancing
Application security groups
Network manager
Settings
Availability + scale

<https://portal.azure.com/#> issuing ctrl+shift+F

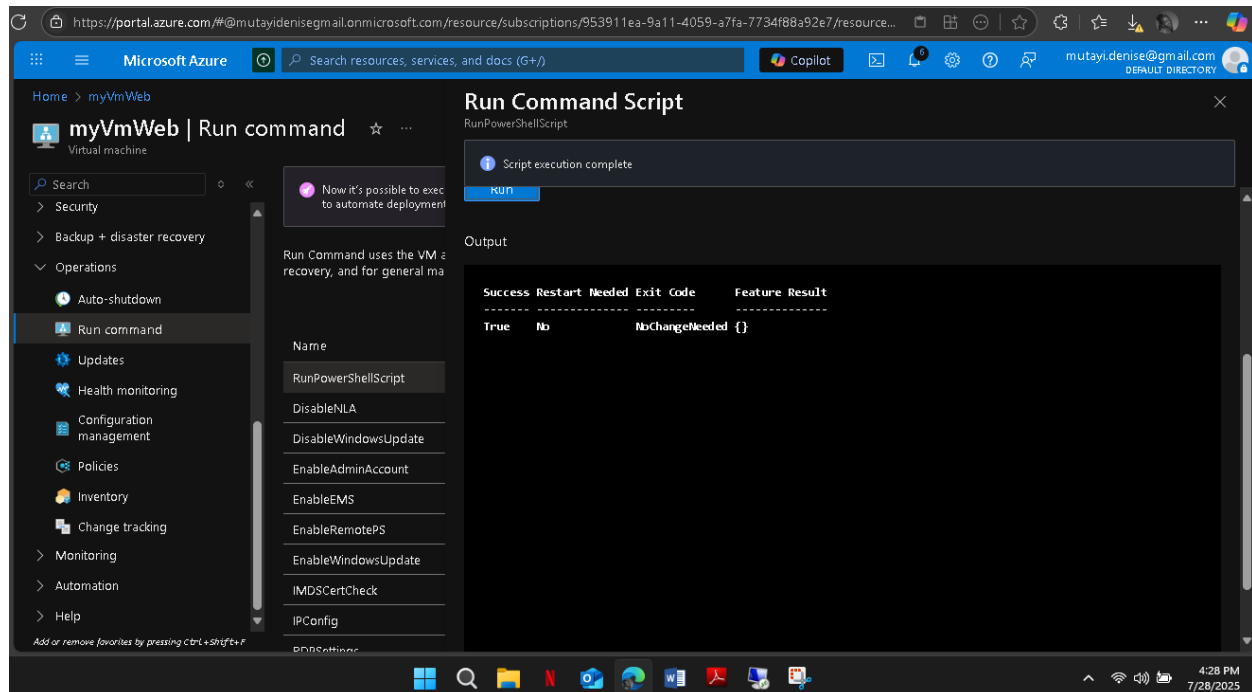
4:03 PM
7/28/2025

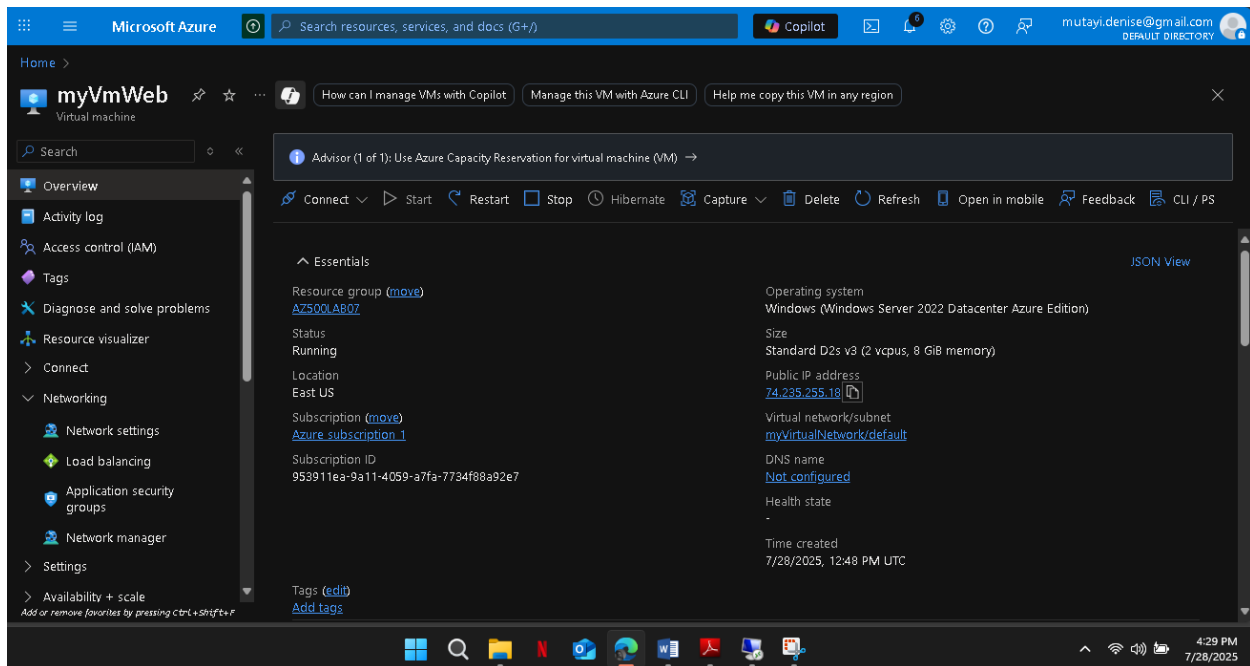
Task 4: Test the network traffic filtering





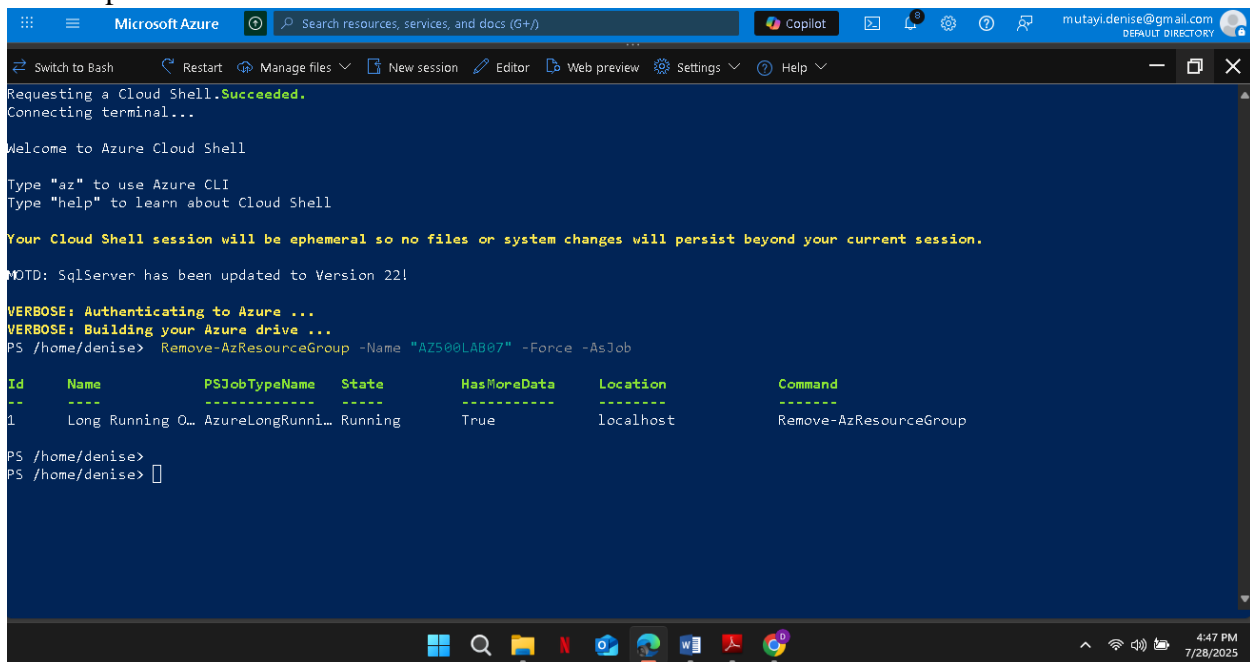
This is a result of re-running the original command. The initial output (now unavailable due to session closure) was identical in status, confirming successful installation.





The public IP address is 74.235.255.18

Clean up resources



Conclusion

At the end of the lab, I successfully verified the security rules applied to the NSG. The HTTP rule allowed access to myVMWeb via its public IP (74.235.255.18), while RDP access was restricted to only the management server. However, when testing the public IP in a browser, the request timed out, likely due to a misconfiguration in the NSG rule, IIS service not running, or VM startup delays. Despite this, the process reinforced the importance of applying NSG rules to ASGs rather than individual IPs, promoting scalable and maintainable cloud network security. Finally, I cleaned up the environment using PowerShell with the `Remove-AzResourceGroup` command, confirming that automation and good hygiene are integral to responsible Azure resource management. The lab strengthened my skills in applying, testing, and validating security configurations within Azure's virtual networking model.