

COURSE: CLOUD AND NEWTORK 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.

The screenshot shows the Microsoft Azure portal with the title 'myVirtualNetwork-1753702736657 | Overview'. A green checkmark icon indicates that the deployment is complete. Deployment details are listed: name: myVirtualNetwork-1753702736657, subscription: Azure subscription 1, resource group: AZ500LAB07, start time: 7/28/2025, 2:39:10 PM, correlation ID: d43a4b74-0233-408b-9c61-3764... Below the deployment status, there are sections for 'Deployment details' and 'Next steps'. Under 'Next steps', there is a blue button labeled 'Go to resource'. To the right of the main content area, there are several promotional cards: 'Cost management' (Get notified to stay within your budget and prevent unexpected charges on your bill), 'Microsoft Defender for Cloud' (Secure your apps and infrastructure), 'Free Microsoft tutorials' (Start learning today), and 'Work with an expert' (Azure experts are service provider partners who can help manage your). The bottom right corner shows the date and time: 7/28/2025, 2:39 PM.

Task 2: Create application security groups

The screenshot shows the Microsoft Azure portal with the title 'myAsgWebServers | Application security group'. The left sidebar shows navigation options: Overview, Activity log, Access control (IAM), Tags, Resource visualizer, Settings, Monitoring, Automation, and Help. The main content area displays the 'Essentials' section for the application security group. It shows the following details: Resource group (move) : AZ500LAB07, Location : East US, Subscription (move) : Azure subscription 1, Subscription ID : 953911ea-9a11-4059-a7fa-7734f98a92e7, and Tags (edit) : Add tags. There is also a 'Show me metrics for this Application Security Group.' button and a 'How do I troubleshoot issues with this resource?' link. The bottom right corner shows the date and time: 7/28/2025, 2:39 PM.

This group will be for the web servers

Microsoft Azure

Search resources, services, and docs (G+)

Copilot

mutayi.denise@gmail.com

myAsgMgmtServers

Application security group

Search

Move

Delete

Overview

Activity log

Access control (IAM)

Tags

Resource visualizer

Settings

Monitoring

Automation

Help

Resource group (move) : AZ500LAB07

Location : East US

Subscription (move) : Azure subscription_1

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

Tags (edit) : Add tags

Add or remove favorites by pressing Ctrl+Shift+F

2:50 PM 7/28/2025

This group will be for the management servers

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

Microsoft Azure

Search resources, services, and docs (G+)

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CreateNetworkSecurityGroupBladeV2-20250728145227 | Overview

Deployment

Search

Delete

Cancel

Redeploy

Download

Refresh

Overview

Inputs

Outputs

Template

Your deployment is complete

Deployment name : CreateNetworkSecurityGroupBladeV2-20250728145227 Start time : 7/28/2025, 2:53:32 PM

Subscription : Azure subscription 1 Correlation ID : 04b556a0-1351-42df-801f-102d1...

Resource group : AZ500LAB07

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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Work with an expert

Azure experts are service provider partners who can help manage your

Add or remove favorites by pressing Ctrl+Shift+F

2:53 PM 7/28/2025

Microsoft Azure

Home > Network foundation | Network security groups > myNsg

myNsg | Subnets

Network security group

Search

Associate

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

Add or remove favorites by pressing **Ctrl+Shift+F**

Name Address range Virtual network

Name	Address range	Virtual network
default	10.0.0.0/24	myVirtualNetwork

Give feedback

2:56 PM 7/28/2025

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

Microsoft Azure

Home > Network foundation | Network security groups > myNsg

myNsg | Inbound security rules

Network security group

Search

Add Hide default rules Refresh Delete Give feedback

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

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

Priority Name Port Protocol Source Destination Action

2:59 PM 7/28/2025

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes 'Microsoft Azure', 'Upgrade', 'Search resources, services, and docs (G+)', 'Copilot', and user information 'mutayi.denise@gmail.com DEFAULT DIRECTORY'. The main content area is titled 'myNsg | Inbound security rules' under 'Network foundation | Network security groups > myNsg'. A success message 'Created security rule' and 'Successfully created security rule 'Allow-RDP-All''. The left sidebar contains navigation links like Home, Network foundation, Network security groups, myNsg, Access control (IAM), Tags, Diagnose and solve problems, Resource visualizer, Settings, Inbound security rules (selected), Outbound security rules, Network interfaces, Subnets, Properties, Locks, Monitoring, Automation, and Help. The right pane displays a table of inbound security rules:

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

Exercise 2: Deploy virtual machines and test network filters

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

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes 'Microsoft Azure', 'Search resources, services, and docs (G+)', 'Copilot', and user information 'mutayi.denise@gmail.com DEFAULT DIRECTORY'. The main content area is titled 'CreateVm-MicrosoftWindowsServer.WindowsServer-202-20250728154510 | Overview' under 'Deployment'. The left sidebar contains navigation links like Home, Deployment (selected), Overview (selected), Inputs, Outputs, and Template. The right pane displays deployment details:

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: AZ500LAB07	

Deployment details:

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

Next steps:

- 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: Start learning today >

Work with an expert: Azure experts are service provider partners who can help manage your assets on Azure.

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

The screenshot shows the Microsoft Azure portal interface for managing a virtual machine. The main title bar says "Microsoft Azure" and the sub-page title is "CreateVm-MicrosoftWindowsServer.WindowsServer-202-20250728155140 | Overview". The left sidebar has a tree view with "Virtual machines" selected. The main content area displays the "Essentials" tab for the VM "myVMMgmt". Key details shown include:

- 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 status bar at the bottom right shows "3:56 PM" and "7/28/2025".

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

The screenshot shows the Microsoft Azure portal interface for managing virtual machines. The title bar says "Compute infrastructure" and the sub-page title is "Virtual machines". The left sidebar has a tree view with "Virtual machines" selected. The main content area displays a list of virtual machines:

Name	Subscription	Resource Group	Location	Status	Operating system	Size
myVMMgmt	Azure subscription 1	AZ500LAB07	East US	Running	Windows	Standard_D2s_v3
myVmWeb	Azure subscription 1	AZ500LAB07	East US	Running	Windows	Standard_D2s_v3

At the bottom, there are tabs for Create, Switch to classic, Reservations, Manage view, Refresh, Export to CSV, Open query, Group by none, and a filter bar. The status bar at the bottom right shows "3:56 PM" and "7/28/2025".

Both are running

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

myVMMgmt | Application security groups

Virtual machine

Search

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 $Ctrl+Shift+F$

Copilot

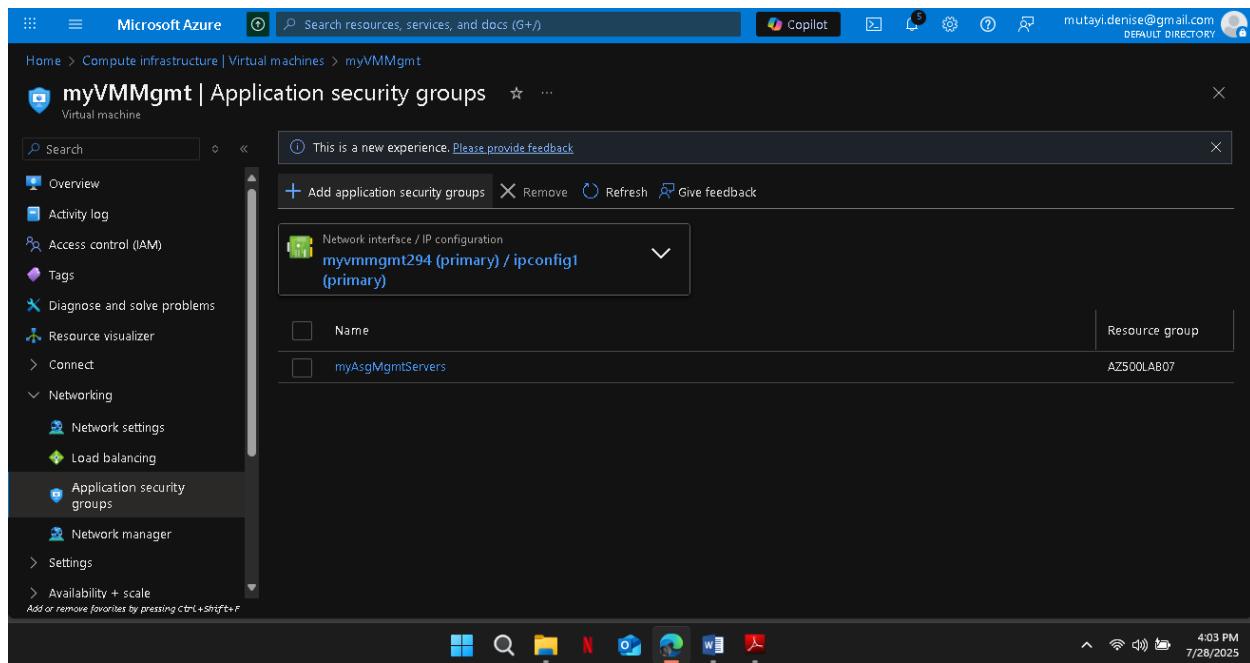
This is a new experience. Please provide feedback

+ Add application security groups X Remove ⚡ Refresh Give feedback

Network interface / IP configuration
myVMMgmt294 (primary) / ipconfig (primary)

Name myAsgMgmtServers Resource group AZ500LAB07

4:03 PM 7/28/2025



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

myVmWeb | Application security groups

Virtual machine

Search

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/#&page=VirtualMachines&resourceId=/subscriptions/00000000-0000-0000-0000-000000000000/resourceGroups/AZ500LAB07/providers/Microsoft.Compute/virtualMachines/myVmWeb&virtualMachineName=myVmWeb

Copilot

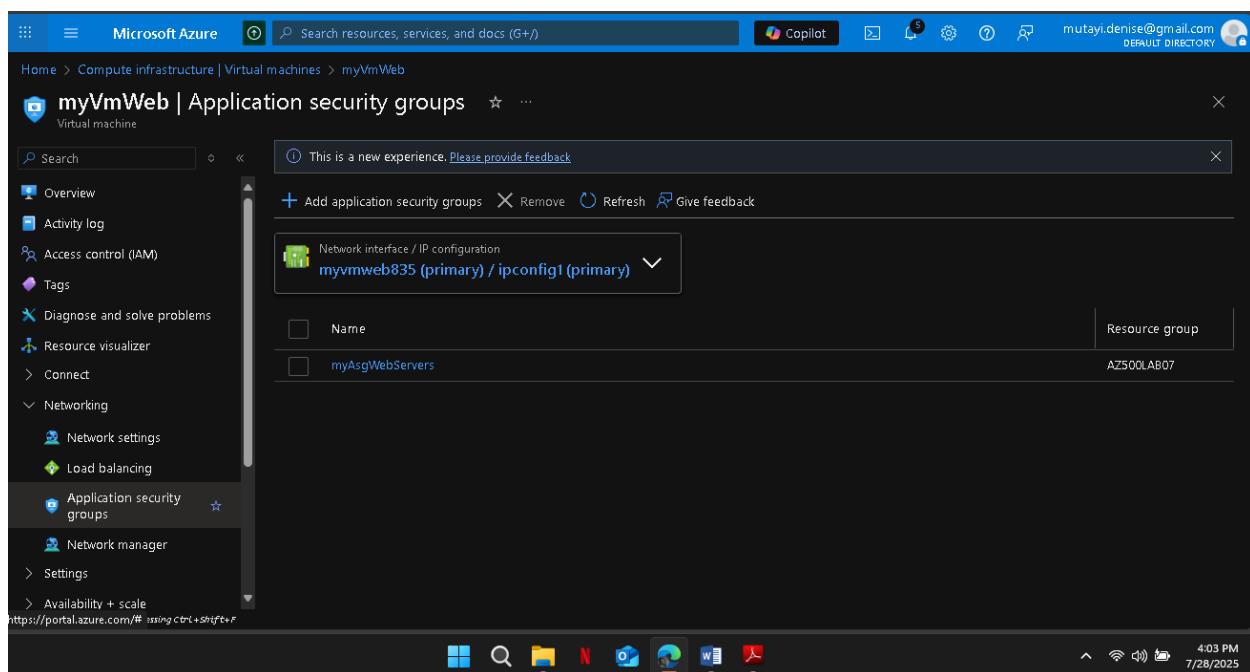
This is a new experience. Please provide feedback

+ Add application security groups X Remove ⚡ Refresh Give feedback

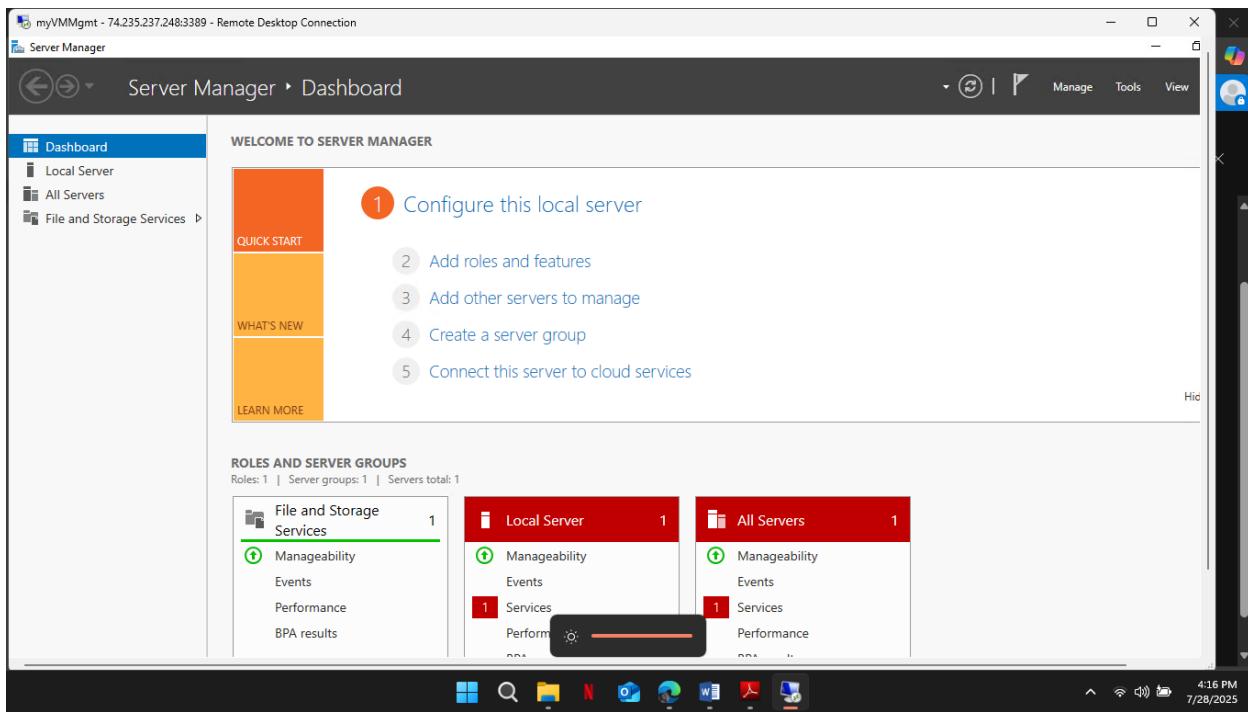
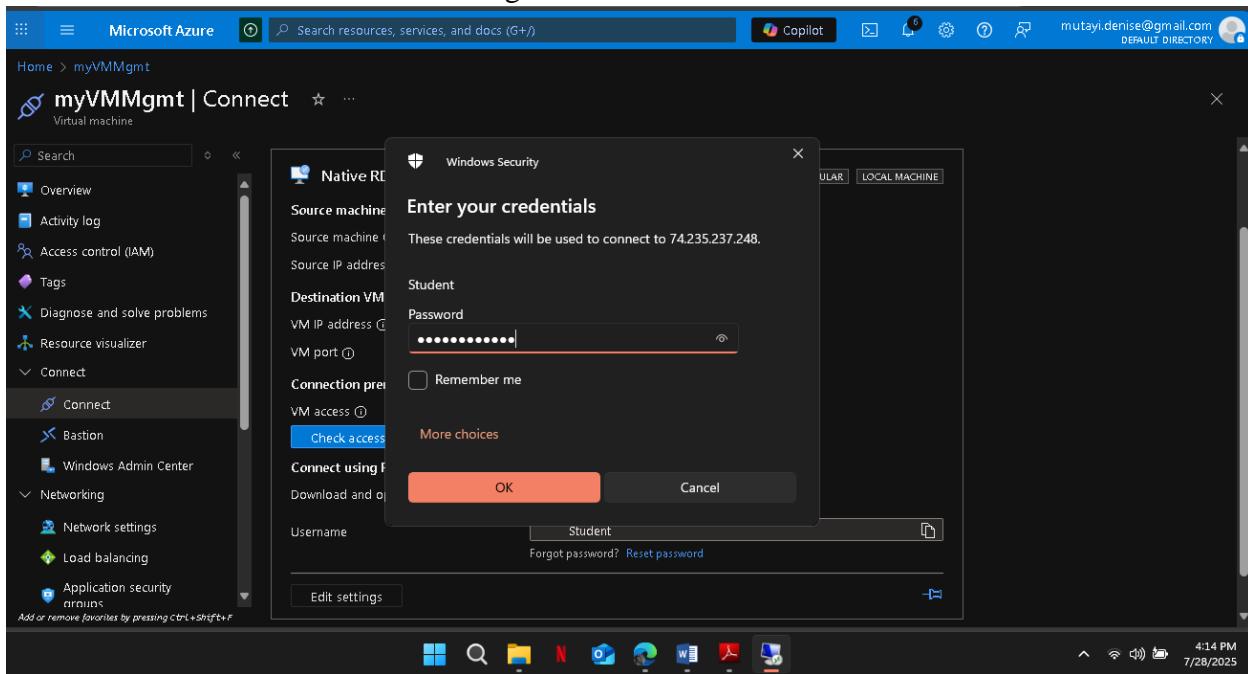
Network interface / IP configuration
myvmweb835 (primary) / ipconfig (primary)

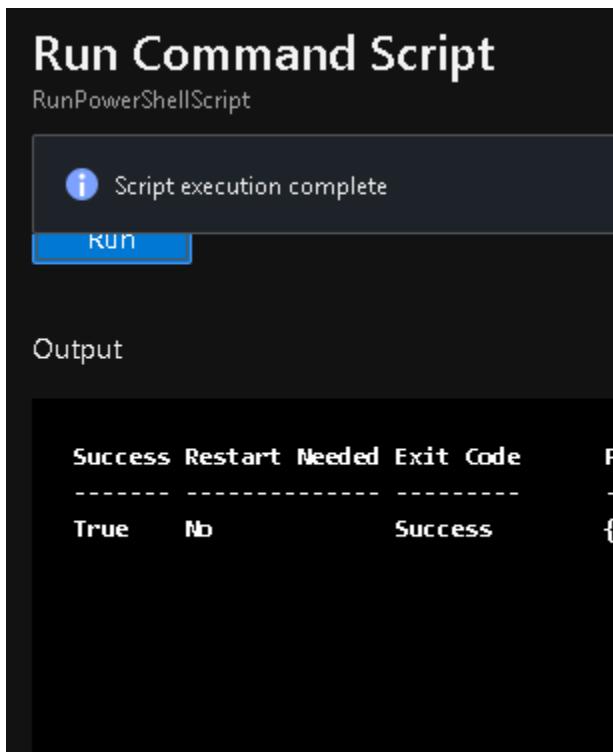
Name myAsgWebServers Resource group AZ500LAB07

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 screenshot shows the Microsoft Azure portal interface. The left sidebar shows a navigation tree for 'myVmWeb' under 'Virtual machines'. The 'Run command' option is selected. The main content area is titled 'Run Command Script' and shows the 'RunPowerShellScript' command has been run successfully. The output table is identical to the one in the previous screenshot:

Success	Restart	Needed	Exit Code	Feature Result
True	No		Success	{}

Microsoft Azure

myVmWeb Virtual machine

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

Tags (edit) Add tags

Essentials

Resource group (move) AZ500LAB07

Status Running

Location East US

Subscription (move) 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 74.235.255.18

Virtual network/subnet myVirtualNetwork/default

DNS name Not configured

Health state -

Time created 7/28/2025, 12:48 PM UTC

JSON View

The public IP address is 74.235.255.18

Clean up resources

Switch to Bash

Restart Manage files New session Editor Web preview Settings Help

Requesting a Cloud Shell. **Succeeded.**

Connecting terminal...

Welcome to Azure Cloud Shell

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

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

MOTD: SqlServer has been updated to Version 22!

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...

```
PS /home/denise> Remove-AzResourceGroup -Name "AZ500LAB07" -Force -AsJob
```

Id	Name	PSJobTypeName	State	HasMoreData	Location	Command	
1	Long	Running	O... AzureLongRunni...	Running	True	localhost	Remove-AzResourceGroup

```
PS /home/denise>
```

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.