

THREE TIER ARCHITECTURE

Create three subnets : 1. Web tier 2. App tier 3. DB tier DB Tier should not access any tier(Web & App tier) App tier should access the DB tier and Web tier as well, Web tier should access only App tier. Only Web tier is allowed to connect to the internet. Deploy two VM's in each tier (One VM should be Linux & another should be Windows). Configure Apache Server on Linux VM's And IIS Server on Windows.

STEP-BY-STEP IMPLEMENTATION:

Step 1: Create a Virtual Network with 3 Subnets

1. Log in to the [Azure Portal](#).
2. In the search bar, type “Virtual Network” and click Virtual networks.
3. Click + Create.

Fill in the following:

- Subscription: Your active subscription
- Resource Group: Click “Create new” > name it RG-3Tier
- Name: VNet-3Tier
- Region: Choose your region (e.g., East US)

Under IP Addresses tab:

1. Click Add subnet 3 times and set:
 - web-subnet: 10.0.1.0/24
 - app-subnet: 10.0.2.0/24
 - db-subnet: 10.0.3.0/24

Leave DNS, Security, and Tags as default. Click Review + Create → Create.

Home > Network foundation | Virtual networks >

Create virtual network

Basics Security IP addresses 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.](#)

Project details

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

Subscription *	<input type="text" value="Azure subscription 1"/>
Resource group *	<input type="text" value="NetworkWatcherRG"/> Create new

Instance details

Virtual network name *

Region * ⓘ

A resource group is a container that holds related resources for an Azure solution.

Name *

RG-3Tier

OK

Cancel

Create virtual network

...

Basics Security IP addresses 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.](#) 

Project details

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

Subscription *

Azure subscription 1

Resource group *

(New) RG-3Tier

[Create new](#)

Instance details

Virtual network name *

VNet-3Tier

Region * 

(US) East US

[Deploy to an Azure Extended Zone](#)

Add a subnet



Select an address space and configure your subnet. You can customize a default subnet or select from subnet templates if you plan to add select services later. [Learn more](#)

Subnet purpose (i)

Default

Name * (i)

web-subnet

IPv4

Include an IPv4 address space



IPv4 address range (i)

10.0.0.0/16

10.0.0.0 - 10.0.255.255

Starting address * (i)

10.0.1.0

Size (i)

/24 (256 addresses)

Subnet address range (i)

10.0.1.0 - 10.0.1.255

IPv6

Include an IPv6 address space

This virtual network has no IPv6 address ranges.

Private subnet

Private subnets enhance security by not providing default outbound access. To enable outbound connectivity for virtual machines to access the internet, it is necessary to explicitly grant outbound access. A NAT gateway is the recommended way to provide outbound connectivity for virtual machines in the subnet. [Learn more](#)

Enable private subnet (no default outbound access)



Security

Simplify internet access for virtual machines by using a network address translation gateway. Filter subnet traffic using a network security group. [Learn more](#)

NAT gateway (i)

None

[Create new](#)

[Add](#)

[Cancel](#)

[Give feedback](#)

Add a subnet

X

Select an address space and configure your subnet. You can customize a default subnet or select from subnet templates if you plan to add select services later. [Learn more](#)

Subnet purpose (i)

Default

Name * (i)

app-subnet

IPv4

Include an IPv4 address space



IPv4 address range (i)

10.0.0.0/16

10.0.0.0 - 10.0.255.255

Starting address * (i)

10.0.2.0

Size (i)

/24 (256 addresses)

Subnet address range (i)

10.0.2.0 - 10.0.2.255

IPv6

Include an IPv6 address space



This virtual network has no IPv6 address ranges.

Private subnet

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Enable private subnet (no default outbound access)



Security

Simplify internet access for virtual machines by using a network address translation gateway. Filter subnet traffic using a network security group. [Learn more](#)

NAT gateway (i)

None

[Create new](#)

Add a subnet

X

Select an address space and configure your subnet. You can customize a default subnet or select from subnet templates if you plan to add select services later. [Learn more](#)

Subnet purpose i

Default

Name * i

db-subnet

IPv4

Include an IPv4 address space



IPv4 address range i

10.0.0.0/16

10.0.0.0 - 10.0.255.255

Starting address * i

10.0.3.0

Size i

/24 (256 addresses)

Subnet address range i

10.0.3.0 - 10.0.3.255

IPv6

Include an IPv6 address space



This virtual network has no IPv6 address ranges.

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Enable private subnet (no default outbound access)



Security

Simplify internet access for virtual machines by using a network address translation gateway. Filter subnet traffic using a network security group. [Learn more](#)

NAT gateway i

None

[Create new](#)

[Add](#)

[Cancel](#)

 [Give feedback](#)

Create virtual network

...

[Basics](#) [Security](#) [IP addresses](#) [Tags](#) [Review + create](#)

Configure your virtual network address space with the IPv4 and IPv6 addresses and subnets you need. [Learn more](#) ↗

Define the address space of your virtual network with one or more IPv4 or IPv6 address ranges. 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. [Learn more](#) ↗

[+ Add a subnet](#)[^ 10.0.0.0/16](#)[Delete address space](#)

10.0.0.0 - 10.0.255.255

65,536 addresses

Subnets	IP address range	Size	NAT gateway		
default	10.0.0.0 - 10.0.0.255	/24 (256 addresses)	-	Edit	Delete
web-subnet	10.0.1.0 - 10.0.1.255	/24 (256 addresses)	-	Edit	Delete
app-subnet	10.0.2.0 - 10.0.2.255	/24 (256 addresses)	-	Edit	Delete
db-subnet	10.0.3.0 - 10.0.3.255	/24 (256 addresses)	-	Edit	Delete

[Add IPv4 address space](#)

Create virtual network

...

Basics

Security

IP addresses

Tags

Review + create

[View automation template](#)

Basics

Subscription	Azure subscription 1
Resource Group	RG-3Tier
Name	VNet-3Tier
Region	East US

Security

Azure Bastion	Disabled
Azure Firewall	Disabled
Azure DDoS Network Protection	Disabled

IP addresses

Address space	10.0.0.0/16 (65,536 addresses)
Subnet	default (10.0.0.0/24) (256 addresses)
Subnet	web-subnet (10.0.1.0/24) (256 addresses)
Subnet	app-subnet (10.0.2.0/24) (256 addresses)
Subnet	db-subnet (10.0.3.0/24) (256 addresses)

Tags

Home >

VNet-3Tier-1752390297926 | Overview

Deployment

Search X < Delete Cancel Redeploy Download Refresh

Overview Inputs Outputs Template

Deployment is in progress

Deployment name : VNet-3Tier-1752390297926
Subscription : Azure subscription 1
Resource group : RG-3Tier

Start time : 13/07/2025, 12:35:02
Correlation ID : 02a1c6d2-2497-44bc-8a07-a1b5642f67de

Deployment details

Resource	Type	Status	Operation details
There are no resources to display.			

Give feedback
Tell us about your experience with deployment

Step 2: Create Network Security Groups (NSGs)

NSGs control what can come in/out of each subnet.

Repeat these steps 3 times to create NSGs for:

- web-nsg
- app-nsg
- db-nsg

To Create NSG:

1. In search bar, type “Network security group”
2. Click + Create
3. Resource Group: RG-3Tier
4. Region: same as VNet
5. Name:

- o First: web-nsg
- o Then repeat for app-nsg and db-nsg

Home > Network foundation

Network foundation | Network security groups

Search | Create | Manage view | Refresh | Export to CSV | Open query | Assign tags

Overview | Virtual network | Network security groups | Application security groups

Filter for any field... Subscription equals all | Resource group equals all | Location equals all

Showing 0 to 0 of 0 records.

Name ↑	Resource group ↑	Location

Virtual Network overview | Virtual networks | NAT gateways | Public IP addresses | Network interfaces | Network security groups | Application security groups

Home > Network foundation | Network security groups >

Create network security group

Basics Tags Review + create

Project details

Subscription *

Azure subscription 1

Resource group *

RG-3Tier

Create new

Instance details

Name *

web-nsg

Region *

East US

Create network security group

 Validation passed

Basics Tags Review + create

Basics

Subscription Azure subscription 1
Resource group RG-3Tier
Region East US
name web-nsg

Tags

None

Home >



Microsoft.NetworkSecurityGroup-20250713124213 | Overview

...

 Search  Delete  Cancel  Redeploy  Download  Refresh

 Overview
 Inputs
 Outputs 
 Template

 Your deployment is complete

 Deployment name : Microsoft.NetworkSecurityGroup-20250713124213
Subscription : Azure subscription 1
Resource group : RG-3Tier

Start time : 13/07/2025, 12:43:21
Correlation ID : 0f418206-248f-4352-97b8-f137100199be

 Deployment details

 Next steps

 Go to resource

Give feedback

 Tell us about your experience with deployment

Home > Network foundation | Network security groups >

Create network security group

Basics Tags Review + create

Project details

Subscription *

Azure subscription 1

Resource group *

RG-3Tier

[Create new](#)

Instance details

Name *

app-nsg

Region *

East US

Home > Network foundation | Network security groups >

Create network security group



Validation passed

Basics Tags Review + create

Basics

Subscription

Azure subscription 1

Resource group

RG-3Tier

Region

East US

name

app-nsg

Tags

None

Home >

Microsoft.NetworkSecurityGroup-20250713124437 | Overview



Deployment

x

<



Delete



Cancel



Redeploy



Download



Refresh

Overview

Inputs

Outputs

Template

Deployment is in progress

Deployment name : Microsoft.NetworkSecurityGroup-20250713124437

Start time : 13/07/2025, 12:45:13

Subscription : Azure subscription 1

Correlation ID : 10bc2cab-2f1b-451e-9f47-b9fc04d8cf0d

Resource group : RG-3Tier

Deployment details

Resource	Type	Status	Operation details
There are no resources to display.			

Give feedback

Tell us about your experience with deployment

Home > Network foundation | Network security groups >

Create network security group

Basics Tags Review + create

Project details

Subscription *

Azure subscription 1

Resource group *

RG-3Tier

[Create new](#)

Instance details

Name *

db-nsg



Region *

East US



Create network security group

 Validation passed

Basics Tags Review + create

Basics

Subscription	Azure subscription 1
Resource group	RG-3Tier
Region	East US
name	db-nsg

Tags

None

Home >



Microsoft.NetworkSecurityGroup-20250713124543 | Overview ✎ ⚙

Deployment

 Search X << Delete Cancel Redeploy Download Refresh

 Overview

 Inputs

 Outputs

 Template

 Your deployment is complete

Deployment name : Microsoft.NetworkSecurityGroup-20250713124543

Start time : 13/07/2025, 12:46:35

Subscription : Azure subscription 1

Correlation ID : 2c2ff7e9-732b-4ddd-858e-9433b4f454f1

Resource group : RG-3Tier

 Deployment details

 Next steps

[Go to resource](#)

Step 3: Associate NSGs to Subnets

1. Go to your VNet-3Tier > Subnets
2. Click web-subnet > associate NSG: choose web-nsg
3. Do the same:
 - o app-subnet → app-nsg
 - o db-subnet → db-nsg

The screenshot shows the Microsoft Azure portal interface for managing subnets in a virtual network named 'VNet-3Tier'. The left sidebar menu is visible, with 'Subnets' selected. The main content area displays a table of subnets, each with a checkbox, an IP range, and the number of available IPs. The 'web-subnet' row is highlighted with a gray background and has a checked checkbox in the first column.

	Name ↑	IPv4	IPv6	Available IPs
<input type="checkbox"/>	default	10.0.0.0/24	-	251
<input checked="" type="checkbox"/>	web-subnet	10.0.1.0/24	-	251
<input type="checkbox"/>	app-subnet	10.0.2.0/24	-	251
<input type="checkbox"/>	db-subnet	10.0.3.0/24	-	251

Edit subnet

X

Private subnets enhance security by not providing default outbound access. To enable outbound connectivity for virtual machines to access the internet, it is necessary to explicitly grant outbound access. A NAT gateway is the recommended way to provide outbound connectivity for virtual machines in the subnet. [Learn more](#)

Enable private subnet (no default outbound access)

Security

Simplify internet access for virtual machines by using a network address translation gateway. Filter subnet traffic using a network security group. [Learn more](#)

NAT gateway ⓘ

None



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

Network security group ⓘ

web-nsg



Route table

None



Service Endpoints

Create service endpoint policies to allow traffic to specific azure resources from your virtual network over service endpoints. [Learn more](#)

Services

Remove service endpoint

Select a service endpoint



Subnet Delegation

Delegate subnet to a service

None



Network Policy for Private Endpoints

The network policy affects the types of network policies that control traffic going to the private endpoints in this subnet. [Learn more](#)

Private endpoint network policy

Disabled



VNet-3Tier | Subnets

Virtual network

Search Subnet Refresh Manage users Delete

Create subnets to segment the virtual network address space into smaller ranges for use by your applications. When you deploy resources to a subnet, they receive a private IP address from the subnet's range.

Name ↑	IPv4	IPv6	Available IPs
default	10.0.0.0/24	-	251
app-subnet	10.0.2.0/24	-	251
db-subnet	10.0.3.0/24	-	251
web-subnet	10.0.1.0/24	-	251

Edit subnet

X

IPv4

Include an IPv4 address space



Choose a starting address and size within your IPv4 address range: 10.0.0.0/16 (10.0.0.0 - 10.0.255.255)

Starting address * ⓘ

10.0.2.0

Size ⓘ

/24 (256 addresses)



Subnet address range ⓘ

10.0.2.0 - 10.0.2.255

IPv6

Include an IPv6 address space



This virtual network has no IPv6 address ranges.

Private subnet

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NAT gateway ⓘ

None



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Network security group ⓘ

app-nsg



Route table

None



Service Endpoints

Create service endpoint policies to allow traffic to specific Azure resources from your virtual network over service endpoints. [Learn more ↗](#)

VNet-3Tier | Subnets

Virtual network

[+ Subnet](#)

Create subnets to segment the virtual network address space into smaller ranges for use by your applications. When you deploy reso

[Manage users](#)[Delete](#)[Overview](#)[Activity log](#)[Access control \(IAM\)](#)[Tags](#)[Diagnose and solve problems](#)[Resource visualizer](#)[Settings](#)[Address space](#)[Connected devices](#)[Subnets](#)

<input type="checkbox"/>	Name ↑	IPv4	IPv6	Available IPs
<input type="checkbox"/>	default	10.0.0.0/24	-	251
<input checked="" type="checkbox"/>	db-subnet	10.0.3.0/24	-	251
<input type="checkbox"/>	web-subnet	10.0.1.0/24	-	251
<input type="checkbox"/>	app-subnet	10.0.2.0/24	-	251

Edit subnet

X

Size ⓘ

/24 (256 addresses)

▼

Subnet address range ⓘ

10.0.3.0 - 10.0.3.255

IPv6

Include an IPv6 address space

This virtual network has no IPv6 address ranges.

Private subnet

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Enable private subnet (no default outbound access)



Security

Simplify internet access for virtual machines by using a network address translation gateway. Filter subnet traffic using a network security group. [Learn more ↗](#)

NAT gateway ⓘ

None

▼

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

Network security group ⓘ

db-nsq

▼

Route table

None

▼

Service Endpoints

Create service endpoint policies to allow traffic to specific azure resources from your virtual network over service endpoints. [Learn more ↗](#)

Services

Remove service endpoint

Select a service endpoint

▼

Subnet | Refresh | Manage users | Delete

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	Route table
default	10.0.0.0/24	-	251	-	-	-
web-subnet	10.0.1.0/24	-	251	-	web-nsg	-
app-subnet	10.0.2.0/24	-	251	-	app-nsg	-
db-subnet	10.0.3.0/24	-	251	-	db-nsg	-

Step 4: Configure NSG Rules

To create a rule:

- Go to each NSG → Inbound/Outbound rules → Add rule

Assumptions: IP Address Ranges

Make sure your subnets are like this (or adjust based on your setup):

Tier	Subnet Name	Subnet CIDR
------	-------------	-------------

Web Tier web-subnet 10.0.1.0/24

App Tier app-subnet 10.0.2.0/24

DB Tier db-subnet 10.0.3.0/24

◇ A. web-nsg Rules (for Web Subnet)

Apply these rules to the NSG associated with web-subnet.

✚ Rule 1: Allow Internet (HTTP)

Field	Value
Source	Service Tag
Source tag	Internet
Destination port	80
Protocol	TCP
Action	Allow
Priority	100
Name	Allow-HTTP-Internet

✚ Rule 2: Allow App Tier to Access (e.g. internal health checks)

Field	Value
Source	IP Addresses
Source IP	10.0.2.0/24
Destination port	8080 (or 80)
Protocol	TCP
Action	Allow
Priority	110
Name	Allow-App-To-Web

— Rule 3: Deny All Other Inbound (Optional)

Azure denies by default, so you may skip this.

◇ B. app-nsg Rules (for App Subnet)

Apply these rules to the NSG associated with app-subnet.

✚ Rule 1: Allow Web Tier to Access App

Field	Value
Source	IP Addresses
Source IP	10.0.1.0/24
Destination port	8080 (or app port)
Protocol	TCP
Action	Allow
Priority	100
Name	Allow-Web-To-App

✚ Rule 2: Allow App to Access DB

Field	Value
Source	IP Addresses
Source IP	10.0.2.0/24
Destination port	1433 (SQL) or 3306 (MySQL)
Protocol	TCP
Action	Allow
Priority	110
Name	Allow-App-To-DB

◇ C. db-nsg Rules (for DB Subnet)

Apply these rules to the NSG associated with db-subnet.

✚ Rule 1: Allow App Tier to Access DB

Field	Value
Source	IP Addresses
Source IP	10.0.2.0/24
Destination port	1433 / 3306
Protocol	TCP
Action	Allow
Priority	100
Name	Allow-App-To-DB

— Rule 2: Deny Outbound to Web and App (Optional)

Azure allows all outbound by default. To restrict:

Field	Value
Direction	Outbound
Destination	IP Addresses
Destination IP	10.0.1.0/24, 10.0.2.0/24
Port	Any
Protocol	Any
Action	Deny
Priority	100

Field	Value
Name	Deny-DB-To-Others

Summary Table

NSG	Rule Name	Source	Destination Port	Action
web-nsg	Allow-HTTP-Internet	Internet (tag)	80	Allow
web-nsg	Allow-App-To-Web	10.0.2.0/24	8080 or 80	Allow
app-nsg	Allow-Web-To-App	10.0.1.0/24	8080	Allow
app-nsg	Allow-App-To-DB	10.0.2.0/24	1433 / 3306	Allow
db-nsg	Allow-App-To-DB	10.0.2.0/24	1433 / 3306	Allow
db-nsg	Deny-DB-To-Others	10.0.1.0/24 / 10.0.2.0/24	Any	Deny

Home > web-nsg

web-nsg | Inbound security rules ⚡ ⋮

Network security group

◊ «

+ Add ⚡ Hide default rules

⟳ Refresh

─ Delete

↗ Give feedback

Overview

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 rules, but you can override them with rules that have a higher priority. [Learn more ↗](#)

Activity log

Access control (IAM)

Filter by name

Port == all

Protocol == all

Source == all

Destination == all

Action == all

Tags

Diagnose and solve problems

Resource visualizer

Settings

Inbound security rules

Outbound security rules

Network interfaces

Subnets

Priority ↑↓	Name ↑↓	Port ↑↓	Protocol ↑↓	Source ↑↓
<input type="checkbox"/> 65000	AllowVnetInBound	Any	Any	VirtualNetwork
<input type="checkbox"/> 65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer
<input type="checkbox"/> 65500	DenyAllInBound	Any	Any	Any



Allow-App-To-Web

X

Source ⓘ

IP Addresses

Source IP addresses/CIDR ranges * ⓘ

10.0.2.0/24

Source port ranges * ⓘ

*

Destination ⓘ

Any

Service ⓘ

Custom

Destination port ranges * ⓘ

8080

Protocol

Any

TCP

UDP

ICMPv4

ICMPv6

Action

Allow

Deny

Priority * ⓘ

100



Name

Allow-App-To-Web

Save

Cancel

Give feedback

Allow-App-To-Web1

Source IP addresses/CIDR ranges * ①
10.0.2.0/24

Source port ranges * ①
*

Destination port ranges * ①
8080

Protocol
 Any
 TCP
 UDP
 ICMPv4
 ICMPv6

Action
 Allow
 Deny

Priority * ①
110

Name
Allow-App-To-Web1

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



Allow-HTTP-Internet

X

Source ⓘ

Service Tag

Source service tag * ⓘ

Internet

Source port ranges * ⓘ

*

Destination ⓘ

Any

Service ⓘ

HTTP

Destination port ranges ⓘ

80

Protocol

Any

TCP

UDP

ICMPv4

ICMPv6

Action

Allow

Deny

Priority * ⓘ

200



Name

Allow-HTTP-Internet

Save

Cancel

Give feedback

Home > **web-ns** ⚡ ⭐ ...

Overview

Resource group (move) : RG-3Tier
Location : East US
Subscription (move) : Azure subscription 1
Subscription ID : d69b934d-dda2-44e2-8b9d-d19aa122435b
Tags (edit) : Add tags

Custom security rules : 3 inbound, 0 outbound
Associated with : 1 subnets, 0 network interfaces

Priority ↑↓	Name ↑↓	Port ↑↓	Protocol ↑↓	Source ↑↓	Destination ↑↓	Action ↑↓
Inbound Security Rules						
100	Allow-App-To-Web	8080	Any	10.0.2.0/24	Any	Allow
110	Allow-App-To-Web1	8080	TCP	10.0.2.0/24	Any	Allow
200	Allow-HTTP-Internet	80	TCP	Internet	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny
Outbound Security Rules						
65000	AllowVnetOutBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowInternetOutBound	Any	Any	Any	Internet	Allow
65500	DenyAllOutBound	Any	Any	Any	Any	Deny

Home > **app-ns** ⚡ ⭐ ...

Overview

Resource group (move) : RG-3Tier
Location : East US
Subscription (move) : Azure subscription 1
Subscription ID : d69b934d-dda2-44e2-8b9d-d19aa122435b
Tags (edit) : Add tags

Custom security rules : 0 inbound, 0 outbound
Associated with : 1 subnets, 0 network interfaces

Priority ↑↓	Name ↑↓	Port ↑↓	Protocol ↑↓	Source ↑↓	Destination ↑↓	Action ↑↓
Inbound Security Rules						
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny
Outbound Security Rules						
65000	AllowVnetOutBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowInternetOutBound	Any	Any	Any	Internet	Allow
65500	DenyAllOutBound	Any	Any	Any	Any	Deny



Allow-Web-To-App



app-nsg

Source (i)

IP Addresses (i)

Source IP addresses/CIDR ranges * (i)

Source port ranges * (i)

Destination (i)

Any (i)

Service (i)

Custom (i)

Destination port ranges * (i)

Protocol

- Any
- TCP
- UDP
- ICMPv4
- ICMPv6

Action

- Allow
- Deny

Priority * (i)

 ✓

Name

SaveCancel [Give feedback](#)



Allow-App-To-DB

X

Source ⓘ

IP Addresses

Source IP addresses/CIDR ranges * ⓘ

10.0.2.0/24

Source port ranges * ⓘ

*

Destination ⓘ

Any

Service ⓘ

MS SQL

Destination port ranges ⓘ

1433

Protocol

Any

TCP

UDP

ICMPv4

ICMPv6

Action

Allow

Deny

Priority * ⓘ

110



Name

Allow-App-To-DB

Save

Cancel

Give feedback



Allow-App-To-DB1

X

app-nsg

Source ⓘ

IP Addresses



Source IP addresses/CIDR ranges * ⓘ

10.0.2.0/24

Source port ranges * ⓘ

*

Destination ⓘ

Any



Service ⓘ

MySQL



Destination port ranges ⓘ

3306

Protocol

Any

TCP

UDP

ICMPv4

ICMPv6

Action

Allow

Deny

Priority * ⓘ

120



Name

Allow-App-To-DB1



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Effective security rules

Support + Troubleshooting

Essentials

Resource group ([move](#)) : [RG-3Tier](#)

Custom security rules : 3 inbound, 0 outbound

Location : East US

Associated with : 1 subnets, 0 network interfaces

Subscription ([move](#)) : [Azure subscription 1](#)

Subscription ID : d69b934d-dda2-44e2-8b9d-d19aa122435b

Tags ([edit](#)) : [Add tags](#)

Filter by name

Port == all

Protocol == all

Source == all

Destination == all

Action == all

Priority ↑↓	Name ↑↓	Port ↑↓	Protocol ↑↓	Source ↑↓	Destination ↑↓	Action ↑↓
<h4>Inbound Security Rules</h4>						
100	Allow-Web-To-App	8080	TCP	10.0.1.0/24	Any	Allow
110	Allow-App-To-DB	1433	TCP	10.0.2.0/24	Any	Allow
120	Allow-App-To-DB1	3306	TCP	10.0.2.0/24	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny
<h4>Outbound Security Rules</h4>						
65000	AllowVnetOutBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowInternetOutBound	Any	Any	Any	Internet	Allow
65500	DenyAllOutBound	Any	Any	Any	Any	Deny

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Essentials

Resource group ([move](#)) : [RG-3Tier](#)

Custom security rules : 0 inbound, 0 outbound

Location : East US

Associated with : 1 subnets, 0 network interfaces

Subscription ([move](#)) : [Azure subscription 1](#)

Subscription ID : d69b934d-dda2-44e2-8b9d-d19aa122435b

Tags ([edit](#)) : [Add tags](#)

Filter by name

Port == all

Protocol == all

Source == all

Destination == all

Action == all

Priority ↑↓	Name ↑↓	Port ↑↓	Protocol ↑↓	Source ↑↓	Destination ↑↓	Action ↑↓
<h4>Inbound Security Rules</h4>						
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny
<h4>Outbound Security Rules</h4>						
65000	AllowVnetOutBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowInternetOutBound	Any	Any	Any	Internet	Allow
65500	DenyAllOutBound	Any	Any	Any	Any	Deny



Allow-App-To-DB

X

Source ⓘ

IP Addresses



Source IP addresses/CIDR ranges * ⓘ

10.0.2.0/24

Source port ranges * ⓘ

*



Destination ⓘ

Any



Service ⓘ

MS SQL



Destination port ranges ⓘ

1433

Protocol

- Any
- TCP
- UDP
- ICMPv4
- ICMPv6

Action

Allow

Deny

Priority * ⓘ

100



Name

Allow-App-To-DB

Save

Cancel

Give feedback



Allow-App-To-DB1

db-nsg



source ⓘ

IP Addresses



Source IP addresses/CIDR ranges * ⓘ

10.0.2.0/24

Source port ranges * ⓘ

*

Destination ⓘ

Any



Service ⓘ

MySQL



Destination port ranges ⓘ

3306

Protocol

- Any
- TCP
- UDP
- ICMPv4
- ICMPv6

Action

- Allow
- Deny

Priority * ⓘ

110



Name

Allow-App-To-DB1

Save

Cancel

Give feedback

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Effective security rules

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Essentials

Resource group (move) : RG-3Tier

Custom security rules : 2 inbound, 0 outbound

Location : East US

Associated with : 1 subnets, 0 network interfaces

Subscription (move) : Azure subscription 1

Subscription ID : d69b934d-dda2-44e2-8b9d-d19aa122435b

Tags (edit) : Add tags

Inbound Security Rules						
Priority ↑↓	Name ↑↓	Port ↑↓	Protocol ↑↓	Source ↑↓	Destination ↑↓	Action ↑↓
100	Allow-App-To-DB	1433	TCP	10.0.0.0/24	Any	Allow
110	Allow-App-To-DB1	3306	TCP	10.0.0.0/24	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny
Outbound Security Rules						
65000	AllowVnetOutBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowInternetOutBound	Any	Any	Any	Internet	Allow
65500	DenyAllOutBound	Any	Any	Any	Any	Deny



Deny-DB-To-Others

db-nsg



Source ⓘ

Any

Source port ranges * ⓘ

*

Destination ⓘ

IP Addresses

Destination IP addresses/CIDR ranges * ⓘ

10.0.1.0/24,10.0.2.0/24



Service ⓘ

Custom



Destination port ranges * ⓘ

8080

Protocol

Any

TCP

UDP

ICMPv4

ICMPv6

Action

Allow

Deny

Priority * ⓘ

120



Name

Deny-DB-To-Others

Save

Cancel

Give feedback

Home >



Search ⌂ <> Move Delete Refresh Give feedback

Overview

Resource group (move) : RG-3Tier
Location : East US
Subscription (move) : Azure subscription 1
Subscription ID : d69b934d-dda2-44e2-8b9d-d19aa122435b
Tags (edit) : Add tags

Custom security rules : 2 inbound, 1 outbound
Associated with : 1 subnets, 0 network interfaces

Inbound security rules
Outbound security rules
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Effective security rules
Support + Troubleshooting

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

Priority ↑↓	Name ↑↓	Port ↑↓	Protocol ↑↓	Source ↑↓	Destination ↑↓	Action ↑↓
100	Allow-App-To-DB	1433	TCP	10.0.2.0/24	Any	Allow
110	Allow-App-To-DB1	3306	TCP	10.0.2.0/24	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny
120	Deny-DB-To-Others	8080	Any	Any	10.0.1.0/24,10.0.2.0/24	Deny
65000	AllowVnetOutBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowInternetOutBound	Any	Any	Any	Internet	Allow
65500	DenyAllOutBound	Any	Any	Any	Any	Deny

Step 5: Create Virtual Machines

You'll create 6 VMs total (2 in each subnet).

Use Standard B1s or B2s size for demo purposes.

A. Create Web Tier VMs (1 Linux + 1 Windows)

1. In portal, search Virtual Machines → Click + Create
2. Use these settings:

Web-Linux VM

- Name: web-linux

- **Image:** Ubuntu 20.04 LTS
- **Size:** B1s or B2s
- **Authentication:** Password or SSH
- **VNet:** VNet-3Tier
- **Subnet:** web-subnet
- **Public IP:** Yes (for web access)
- **NSG:** Select existing web-nsg

Web-Windows VM

- **Name:** web-win
- **Image:** Windows Server 2019
- **Same settings, just in** web-subnet, web-nsg

B. Repeat for App Tier:

- app-linux, app-win
- In app-subnet, use app-nsg

C. Repeat for DB Tier:

- db-linux, db-win
- In db-subnet, use db-nsg

Create a virtual machine

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

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right

Project details

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

Subscription * 

Azure subscription 1 

Resource group * 

RG-3Tier 

[Create new](#)

Instance details

Virtual machine name * 

web-linux 

Region * 

(US) East US 

Availability options 

Availability zone 

Zone options 

Self-selected zone

Choose up to 3 availability zones, one VM per zone

Azure-selected zone (Preview)

Let Azure assign the best zone for your needs

 Using an Azure-selected zone is not supported in region 'East US'.

Availability zone * 

Zone 1 

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

Security type 

Trusted launch virtual machines 

[Configure security features](#)

Image * 

 Ubuntu Server 24.04 LTS - x64 Gen2 (free services eligible) 

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

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Review + create

Create a virtual machine

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

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right VI

Configure security features

Image * 

 Ubuntu Server 24.04 LTS - x64 Gen2 (free services eligible) 

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

VM architecture 

Arm64
 x64

Run with Azure Spot discount 

 You are in the free trial period. Costs associated with this VM can be covered by any remaining credits on your subscription.
[Learn more](#)

Size * 

Standard_B1s - 1 vcpu, 1 GiB memory (US\$7.59/month) (free services eligible) 

[See all sizes](#)

Enable Hibernation 

 Hibernate does not currently support Trusted launch and Confidential virtual machines for Linux images. [Learn more](#)

Administrator account

Authentication type 

SSH public key
 Password

Username * 

azureuser 

Password * 

***** 

Confirm password * 

***** 

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Review + create

Create public IP address



Name *



SKU ⓘ

Basic Standard



Availability zones are only supported on Standard SKU public IP addresses.

Assignment ⓘ

Static

Routing preference ⓘ

Microsoft network Internet

Availability zone ⓘ

Zone-redundant Zone 1

Create a virtual machine

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right VM

Network interface

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

Virtual network * 

VNet-3Tier 

[Create new](#)

Subnet * 

web-subnet (10.0.1.0/24) 

[Manage subnet configuration](#)

Public IP 

(new) web-linux-ip 

[Create new](#)

NIC network security group 

None

Basic

Advanced

 The selected subnet 'web-subnet (10.0.1.0/24)' is already associated to a network security group 'web-nsg'. We recommend managing connectivity to this virtual machine via the existing network security group instead of creating a new one here.

Configure network security group *

web-nsg 

[Create new](#)

Delete public IP and NIC when VM is deleted 

Enable accelerated networking 

The selected VM size does not support accelerated networking.

Load balancing

You can place this virtual machine in the backend pool of an existing Azure load balancing solution. [Learn more](#) 

Load balancing options 

None

Azure load balancer

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CreateVm-canonical.ubuntu-24_04-lts-server-20250713140836 | Overview

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... Deployment is in progress

Deployment name: CreateVm-canonical.ubuntu-24_04-lts-server-2...

Start time: 13/07/2025, 14:27:00

Subscription: Azure subscription 1

Correlation ID: c1bff647-165a-4863-a859-0f43a23060c7

Resource group: RG-3Tier



^ Deployment details

Resource	Type	Status
No results.		

Give feedback

Tell us about your experience with deployment

Create a virtual machine

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right VM

Project details

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

Subscription * 

Azure subscription 1 

Resource group * 

RG-3Tier 

[Create new](#)

Instance details

Virtual machine name * 

web-win 

Region * 

(US) East US 

Availability options 

Availability zone 

Zone options 

Self-selected zone

Choose up to 3 availability zones, one VM per zone

Azure-selected zone (Preview)

Let Azure assign the best zone for your needs

 Using an Azure-selected zone is not supported in region 'East US'.

Availability zone * 

Zone 1 

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

Security type 

Trusted launch virtual machines 

[Configure security features](#)

Image * 

 Windows Server 2022 Datacenter: Azure Edition - x64 Gen2 (free services el) 

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

VM architecture 

Arm64

Create a virtual machine

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right VM

Run with Azure Spot discount 



 You are in the free trial period. Costs associated with this VM can be covered by any remaining credits on your subscription. [Learn more](#) 

Size * 

Standard_B1s - 1 vcpu, 1 GiB memory (US\$10.22/month) (free services eligib... 

[See all sizes](#)



 Hibernate is not supported by the size that you have selected. Choose a size that is compatible with Hibernate to enable this feature. [Learn more](#) 

Administrator account

Username * 

azureuser 

Password * 

***** 

Confirm password * 

***** 

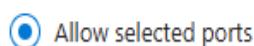
Inbound port rules

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 * 

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.

Create public IP address

X

Name *

web-win-ip



SKU ⓘ

Basic Standard



Availability zones are only supported on Standard SKU public IP addresses.

Assignment ⓘ

Static

Routing preference ⓘ

Microsoft network Internet

Availability zone ⓘ

Zone-redundant Zone 1

Create a virtual machine

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right VM size 

Network interface

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

Virtual network * 

VNet-3Tier 

[Create new](#)

Subnet * 

web-subnet (10.0.1.0/24) 

[Manage subnet configuration](#)

Public IP 

(new) web-win-ip 

[Create new](#)

NIC network security group 

None

Basic

Advanced

 The selected subnet 'web-subnet (10.0.1.0/24)' is already associated to a network security group 'web-nsg'. We recommend managing connectivity to this virtual machine via the existing network security group instead of creating a new one here.

Configure network security group *

web-nsg 

[Create new](#)

Delete public IP and NIC when VM is deleted 



Enable accelerated networking 



The selected VM size does not support accelerated networking.

Load balancing

You can place this virtual machine in the backend pool of an existing Azure load balancing solution. [Learn more](#) 

Load balancing options 

None

[Azure load balancer](#)

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CreateVm-MicrosoftWindowsServer.WindowsServer-202-20250713142907 | Overview ⚡ ...



Deployment

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Delete



Cancel



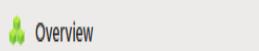
Redeploy



Download



Refresh



Inputs

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Template

Deployment is in progress



Deployment name: CreateVm-MicrosoftWindowsServer.WindowsSe...

Start time: 13/07/2025, 14:32:57

Subscription: Azure subscription 1

Correlation ID: 2626cd77-f69b-4e88-b85d-022fc7d4ff12

Resource group: RG-3Tier



Deployment details

Resource	Type	Status	Operation details
web-win	Microsoft.Compute/virtualMachines	Created	Operation details
web-win581_z1	Microsoft.Network/networkInterfaces	Created	Operation details
web-win-ip	Microsoft.Network/publicIPAddresses	OK	Operation details

Give feedback

Tell us about your experience with deployment

Create a virtual machine

...

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right VM size for

Project details

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

Subscription * 

Azure subscription 1 

Resource group * 

RG-3Tier 

[Create new](#)

Instance details

Virtual machine name * 

app-linux 

Region * 

(US) East US 

Availability options 

Availability zone 

Zone options 

Self-selected zone

Choose up to 3 availability zones, one VM per zone

Azure-selected zone (Preview)

Let Azure assign the best zone for your needs

 Using an Azure-selected zone is not supported in region 'East US'.

Availability zone * 

Zone 1 

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

Security type 

Trusted launch virtual machines 

[Configure security features](#)

Image * 

 Ubuntu Server 24.04 LTS - x64 Gen2 (free services eligible) 

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VM architecture 

Arm64

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Create a virtual machine

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right VM size

 You are in the free trial period. Costs associated with this VM can be covered by any remaining credits on your subscription. [Learn more](#)

Size * 

Standard_B1s - 1 vcpu, 1 GiB memory (US\$7.59/month) (free services eligible) 

[See all sizes](#)

Enable Hibernation 



 Hibernate does not currently support Trusted launch and Confidential virtual machines for Linux images. [Learn more](#)

Administrator account

Authentication type 

SSH public key

Password

Username * 

azureuser 

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

Select one or more ports 

 All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.

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Review + create

Create a virtual machine



Help me create a low cost VM

Help me create a VM optimized for high availability

Help me choose the right V

Network interface

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

Virtual network * ⓘ

VNet-3Tier



[Create new](#)

Subnet * ⓘ

app-subnet (10.0.2.0/24)



[Manage subnet configuration](#)

Public IP ⓘ

None



[Create new](#)

NIC network security group ⓘ

None

Basic

Advanced

i The selected subnet 'app-subnet (10.0.2.0/24)' is already associated to a network security group 'app-nsg'. We recommend managing connectivity to this virtual machine via the existing network security group instead of creating a new one here.

Configure network security group *

app-nsg



[Create new](#)

Delete NIC when VM is deleted ⓘ



Enable accelerated networking ⓘ



The selected VM size does not support accelerated networking.

Load balancing

You can place this virtual machine in the backend pool of an existing Azure load balancing solution. [Learn more ↗](#)

Load balancing options ⓘ

None

Azure load balancer

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X

«



Delete



Cancel



Redeploy



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... Deployment is in progress



Deployment name: CreateVm-canonical.ubuntu-24_04-lts-server-2...

Start time: 13/07/2025, 14:42:18

Subscription: Azure subscription 1

Correlation ID: c37ddb07-91e5-48b5-876b-29242e3d3ded

Resource group: RG-3Tier



^ Deployment details

Resource	Type	Status
app-linux635_z1	Microsoft.Network/networkInterfaces	Created

Give feedback

Tell us about your experience with deployment

Create a virtual machine

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right VM size

Project details

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

Subscription * 

Azure subscription 1 

Resource group * 

RG-3Tier 

[Create new](#)

Instance details

Virtual machine name * 

app-win 

Region * 

(US) East US 

Availability options 

Availability zone 

Zone options 

Self-selected zone

Choose up to 3 availability zones, one VM per zone

Azure-selected zone (Preview)

Let Azure assign the best zone for your needs

 Using an Azure-selected zone is not supported in region 'East US'.

Availability zone * 

Zone 1 

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

Security type 

Trusted launch virtual machines 

[Configure security features](#)

Image * 

 Windows Server 2022 Datacenter: Azure Edition - x64 Gen2 (free services enabled) 

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

VM architecture 

Arm64

Create a virtual machine

Help me create a low cost VM

Help me create a VM optimized for high availability

Help me choose the right VM size

Run with Azure Spot discount



i You are in the free trial period. Costs associated with this VM can be covered by any remaining credits on your subscription. [Learn more ↗](#)

Size *

Standard_B1s - 1 vcpu, 1 GiB memory (US\$10.22/month) (free services eligib...

[See all sizes](#)

Enable Hibernation



i Hibernate is not supported by the size that you have selected. Choose a size that is compatible with Hibernate to enable this feature. [Learn more ↗](#)

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

i All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.

Create a virtual machine

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right VM size

Network interface

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

Virtual network * 

VNet-3Tier

[Create new](#)

Subnet * 

app-subnet (10.0.2.0/24)

[Manage subnet configuration](#)

Public IP 

None



[Create new](#)

NIC network security group 

None

Basic

Advanced

 The selected subnet 'app-subnet (10.0.2.0/24)' is already associated to a network security group 'app-nsg'. We recommend managing connectivity to this virtual machine via the existing network security group instead of creating a new one here.

Configure network security group *

app-nsg



[Create new](#)

Delete NIC when VM is deleted 



Enable accelerated networking 



The selected VM size does not support accelerated networking.

Load balancing

You can place this virtual machine in the backend pool of an existing Azure load balancing solution. [Learn more](#) 

Load balancing options 

None

Azure load balancer

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x

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☰ Deployment is in progress



Deployment name: CreateVm-MicrosoftWindowsServer.WindowsSe...

Start time: 13/07/2025, 14:46:09

Subscription: Azure subscription 1

Correlation ID: 104f48fd-32c8-4e41-927b-67bc2cf4384e

Resource group: RG-3Tier

^ Deployment details

Resource	Type	Status	Operation details
app-win	Microsoft.Compute/virtualMachines	Created	
app-win136_z1	Microsoft.Network/networkInterfaces	Created	

Give feedback

Tell us about your experience with deployment

Create a virtual machine

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right VM size

Project details

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

Subscription * 

Azure subscription 1 

Resource group * 

RG-3Tier 

[Create new](#)

Instance details

Virtual machine name * 

db-win 

Region * 

(US) East US 

Availability options 

Availability zone 

Zone options 

Self-selected zone

Choose up to 3 availability zones, one VM per zone

Azure-selected zone (Preview)

Let Azure assign the best zone for your needs

 Using an Azure-selected zone is not supported in region 'East US'.

Availability zone * 

Zone 1 

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

Security type 

Trusted launch virtual machines 

[Configure security features](#)

Image * 

 Windows Server 2022 Datacenter: Azure Edition - x64 Gen2 (free services enabled) 

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

VM architecture 

Arm64

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Create a virtual machine

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right VM size for my needs

Run with Azure Spot discount 

 You are in the free trial period. Costs associated with this VM can be covered by any remaining credits on your subscription. [Learn more](#)

Size * 

Standard_B1s - 1 vcpu, 1 GiB memory (US\$10.22/month) (free services eligible)

[See all sizes](#)

Enable Hibernation 

 Hibernate is not supported by the size that you have selected. Choose a size that is compatible with Hibernate to enable this feature. [Learn more](#)

Administrator account

Username * 

azureuser 

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

Select one or more ports 

 All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.

< Previous

Next : Disks >

Review + create

Create a virtual machine

...

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right VM size for my work!

Network interface

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

Virtual network * 

VNet-3Tier



[Create new](#)

Subnet * 

db-subnet (10.0.3.0/24)



[Manage subnet configuration](#)

Public IP 

None



[Create new](#)

NIC network security group 

None

Basic

Advanced

 The selected subnet 'db-subnet (10.0.3.0/24)' is already associated to a network security group 'db-nsg'. We recommend managing connectivity to this virtual machine via the existing network security group instead of creating a new one here.

Configure network security group *

db-nsg



[Create new](#)

Delete NIC when VM is deleted 



Enable accelerated networking 



The selected VM size does not support accelerated networking.

Load balancing

You can place this virtual machine in the backend pool of an existing Azure load balancing solution. [Learn more](#) 

Load balancing options 

None

Azure load balancer

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CreateVm-MicrosoftWindowsServer.WindowsServer-202-20250713154248 | Overview

Deployment

Search

X <<



Delete



Cancel



Redeploy



Download



Refresh

Overview

Inputs

Outputs

Template

☰ Deployment is in progress



Deployment name: CreateVm-MicrosoftWindowsServer.WindowsSe... Start time: 13/07/2025, 15:46:12

Subscription: Azure subscription 1

Correlation ID: 2339611f-b54a-4080-8cb7-f87818b891ea



Resource group: RG-3Tier

▲ Deployment details

Resource	Type	Status
db-win494_z1	Microsoft.Network/networkInterfaces	Created

Give feedback

Tell us about your experience with deployment

Create a virtual machine

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right VM size for my needs

Project details

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

Subscription * 

Azure subscription 1 

Resource group * 

RG-3Tier 

[Create new](#)

Instance details

Virtual machine name * 

db-linux 

Region * 

(US) East US 

Availability options 

Availability zone 

Zone options 

Self-selected zone

Choose up to 3 availability zones, one VM per zone

Azure-selected zone (Preview)

Let Azure assign the best zone for your needs

 Using an Azure-selected zone is not supported in region 'East US'.

Availability zone * 

Zone 1 

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

Security type 

Trusted launch virtual machines 

[Configure security features](#)

Image * 

 Ubuntu Server 24.04 LTS - x64 Gen2 (free services eligible) 

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

VM architecture 

Arm64



[< Previous](#)

[Next : Disks >](#)

Review + create

Create a virtual machine

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right VM size

 You are in the free trial period. Costs associated with this VM can be covered by any remaining credits on your subscription. [Learn more](#)

Size * 

Standard_B1s - 1 vcpu, 1 GiB memory (US\$7.59/month) (free services eligible) 

[See all sizes](#)

Enable Hibernation 

 Hibernate does not currently support Trusted launch and Confidential virtual machines for Linux images. [Learn more](#)

Administrator account

Authentication type 

SSH public key

Password

Username * 

azureuser 

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

Select one or more ports 

 All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.

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

Create a virtual machine

 Help me create a low cost VM  Help me create a VM optimized for high availability  Help me choose the right VM size for

Network interface

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

Virtual network * 

VNet-3Tier 
[Create new](#)

Subnet * 

db-subnet (10.0.3.0/24) 
[Manage subnet configuration](#)

Public IP 

None 
[Create new](#)

NIC network security group 

None
 Basic
 Advanced

 The selected subnet 'db-subnet (10.0.3.0/24)' is already associated to a network security group 'db-nsg'. We recommend managing connectivity to this virtual machine via the existing network security group instead of creating a new one here.

Configure network security group * 

db-nsg 
[Create new](#)

Delete NIC when VM is deleted 

Enable accelerated networking 

The selected VM size does not support accelerated networking.

Load balancing

You can place this virtual machine in the backend pool of an existing Azure load balancing solution. [Learn more](#) 

Load balancing options 

None

Advanced 

[Previous](#)  [Next: Management](#)  [Review + Create](#)

Home >



CreateVm-canonical.ubuntu-24_04-lts-server-20250713154705 | Overview

Deployment

X <<



Delete



Cancel



Redeploy



Download



Refresh

Overview

Inputs

Outputs

Template

Deployment is in progress



Deployment name: CreateVm-canonical.ubuntu-24_04-lts-server-2...

Subscription: Azure subscription 1

Resource group: RG-3Tier

Start time: 13/07/2025, 15:48:58

Correlation ID: 3a79c10c-be55-43c4-9527-c6cf05c284aa



Deployment details

Resource	Type	Status
db-linux279_z1	Microsoft.Network/networkInterfaces	Created

Give feedback

[Tell us about your experience with deployment](#)

Home > Compute infrastructure



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Microsoft

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Virtual machines

Get started

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(VMSS)

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Disks

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Disk encryption sets

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You are viewing a new version of Browse experience. Click here to access the old experience.

Filter for any field...

Subscription equals all

Type equals all

Resource Group equals all

Location equals all

+ Add filter

Name ↑	Subscription	Resource Group	Location	Status	Operating sys
app-win	Azure subscription 1	RG-3Tier	East US	Running	Windows
db-linux	Azure subscription 1	RG-3Tier	East US	Running	Linux
db-win	Azure subscription 1	RG-3Tier	East US	Running	Windows
web-win	Azure subscription 1	RG-3Tier	East US	Running	Windows

Step 6: Install Apache (on Linux) and IIS (on Windows)

Goal:

- Show Apache welcome page on Linux VMs.
 - Show IIS welcome page on Windows VMs.
-

PART A: Install Apache on Linux VM (e.g., web-linux)

First: Get Public IP of web-linux VM

1. Go to Azure Portal > Virtual Machines.
2. Click your VM: web-linux.
3. On the Overview page, copy the Public IP address (e.g., 20.81.XX.XX).

Second: Connect via SSH

If using Windows:

1. Open Command Prompt (cmd) or PowerShell.
2. Type this command (replace IP with yours):

bash

CopyEdit

ssh azureuser@<public-ip>

Example: ssh azureuser@20.81.23.45

3. If it asks "Are you sure you want to continue?", type yes.
 4. Enter your password (you set it during VM creation).
-

Third: Run Apache Install Commands

Once you're inside the Linux VM, copy and paste these one by one:

bash

CopyEdit

```
sudo apt update
```

```
sudo apt install apache2 -y
```

```
sudo systemctl start apache2
```

```
sudo systemctl enable apache2
```

Now: Test Apache

1. Open your browser.
2. Go to: <http://<public-ip-of-web-linux>>
3. You should see the Apache2 Ubuntu Default Page.

Apache is installed and working!

PART B: Install IIS on Windows VM (e.g., web-win)

First: Get Public IP of web-win

1. In Azure Portal > Virtual Machines > web-win.
 2. Copy the Public IP address.
-

Second: Connect via RDP (Remote Desktop)

From Windows PC:

1. Press Windows + R → type mstsc → hit Enter.
2. In "Computer", paste the Public IP.
3. Click Connect.
4. Enter:
 - Username: e.g., azureuser
 - Password: (you set during VM creation)

Now you're inside the Windows Server VM.

Third: Install IIS

1. Click Start → type PowerShell → Right click → Run as Administrator
2. Paste this command:

powershell

CopyEdit

Install-WindowsFeature -Name Web-Server -IncludeManagementTools

Wait for it to complete. It may take a few minutes.

Now: Test IIS

1. On your local computer, open a browser.
2. Go to: <http://<public-ip-of-web-win>>
3. You should see the IIS (Internet Information Services) welcome page.

IIS is installed and working!

Compute infrastructure | Virtual machines

Microsoft

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Virtual machines

Get started

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(i) You are viewing a new version of Browse experience. Click here to access the old experience.

[Filter for any field...](#)[Subscription equals all](#)[Type equals all](#)[Resource Group equals all](#)[Location equals all](#)[Add filter](#)

	Name ↑	Subscription	Resource Group	Location	Status	Operating system
	app-win	Azure subscription 1	RG-3Tier	East US	Running	Windows
	db-linux	Azure subscription 1	RG-3Tier	East US	Running	Linux
	db-win	Azure subscription 1	RG-3Tier	East US	Running	Windows
	web-win	Azure subscription 1	RG-3Tier	East US	Running	Windows

web-win-ip | Configuration

Public IP address

Search Save Discard Refresh

Overview IP address assignment
Activity log Static
Access control (IAM) IP address ⓘ
Tags 172.190.113.248
Resource visualizer Idle timeout (minutes) ⓘ
Settings DNS name label (optional) ⓘ

Configuration

Properties

Remote Desktop Connection

Remote Desktop Connection

Computer: 172.190.113.248

User name: None specified

You will be asked for credentials when you connect.

Show Options Connect Help

Remote Desktop Connection



Remote Desktop can't connect to the remote computer for one of these reasons:

- 1) Remote access to the server is not enabled
- 2) The remote computer is turned off
- 3) The remote computer is not available on the network

Make sure the remote computer is turned on and connected to the network, and that remote access is enabled.

Hide details

OK

Error code: 0x204

Extended error code: 0x0

Timestamp (UTC): 07/13/25 10:38:37 AM

Press Ctrl+C to copy.



Windows Security



Enter your credentials

These credentials will be used to connect to 172.190.113.248.

Tanishka Kadam

Password

••••••••••••|



Microsoft Account

\tanishkadeepakkadam01@outlook.com

Remember me

[More choices](#)

OK

Cancel



Windows Security



Your credentials did not work

The credentials that were used to connect to 172.190.113.248 did not work. Please enter new credentials.

Manage vi

gs ▶ Start ⌘

User name

azureuser

Password



Remember me

The logon attempt failed

More choices



Tanishka Kadam

MicrosoftAccount

\tanishkadeepakkadam01@outlook.com



Use a different account

OK

Cancel

Remote Desktop Connection



Your connection round trip time is high and your network might be slow. You may experience issues.

[^ Hide details](#)

OK

Timestamp (UTC): 07/13/25 10:54:32 AM

Activity ID: 3f239874-be78-4d14-a747-d878bb940600

[Client details]

Client version: 10.0.26100.4652 (x64)

Local OS: Windows 10 Home Single Language x64 (10.0, Build 26100)

[Network details]

Transport protocol: TCP

Round-trip time: 190 ms

Available bandwidth: 1.46 Mbps

Frame rate: 0 FPS

[Remote computer details]

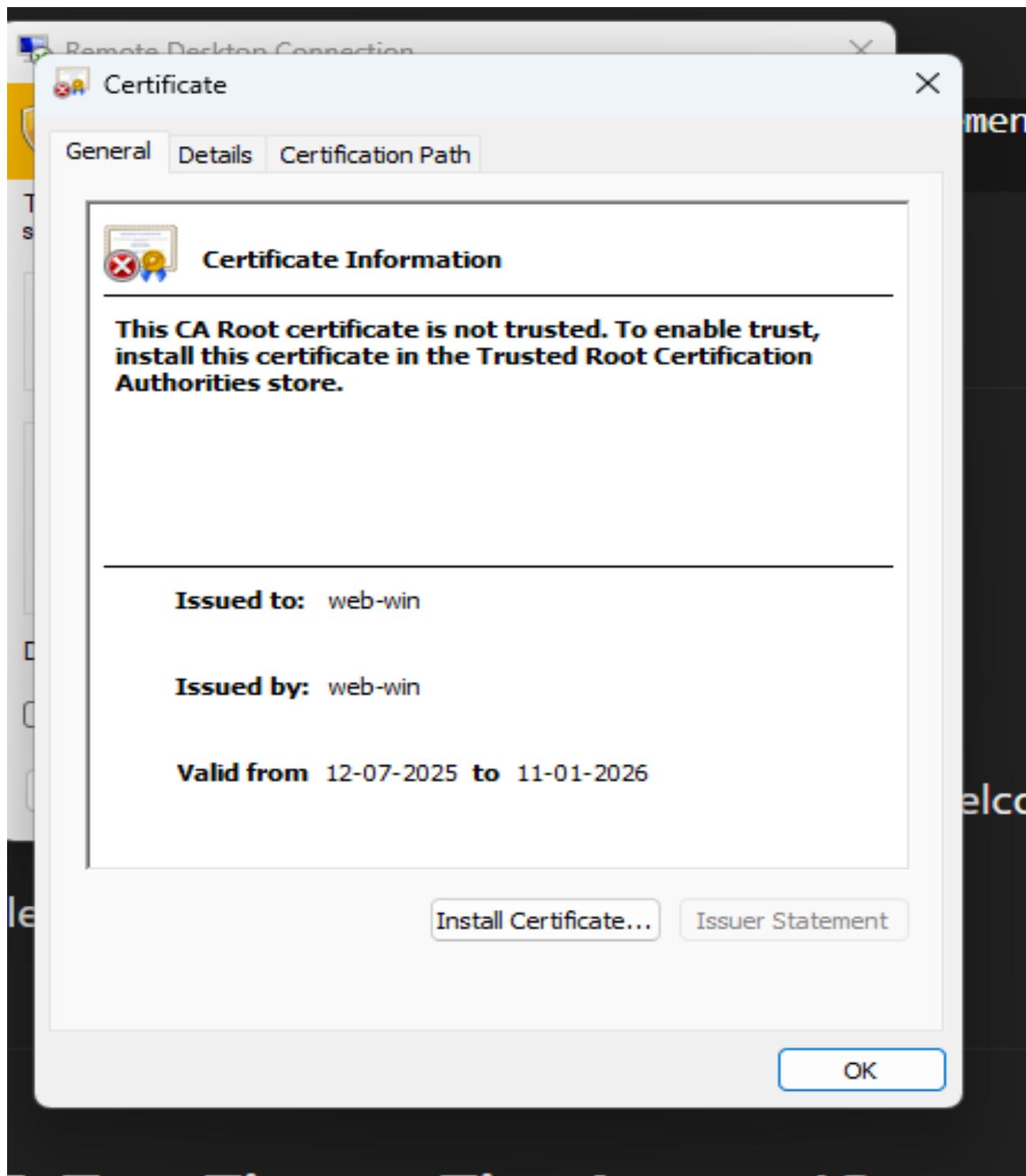
Remote session type: Remote desktop

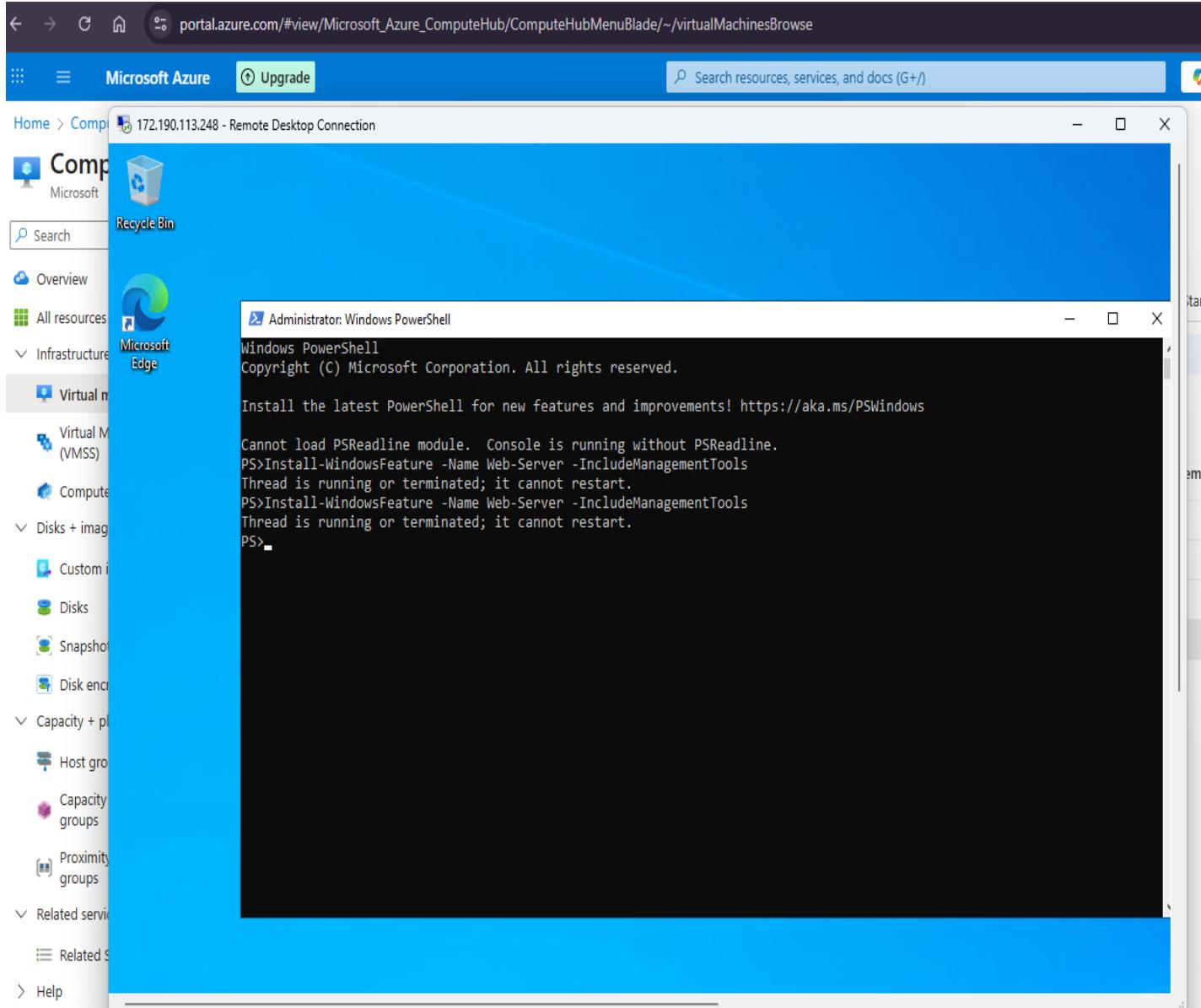
Gateway name: Not in use

Gateway logon method: Not in use

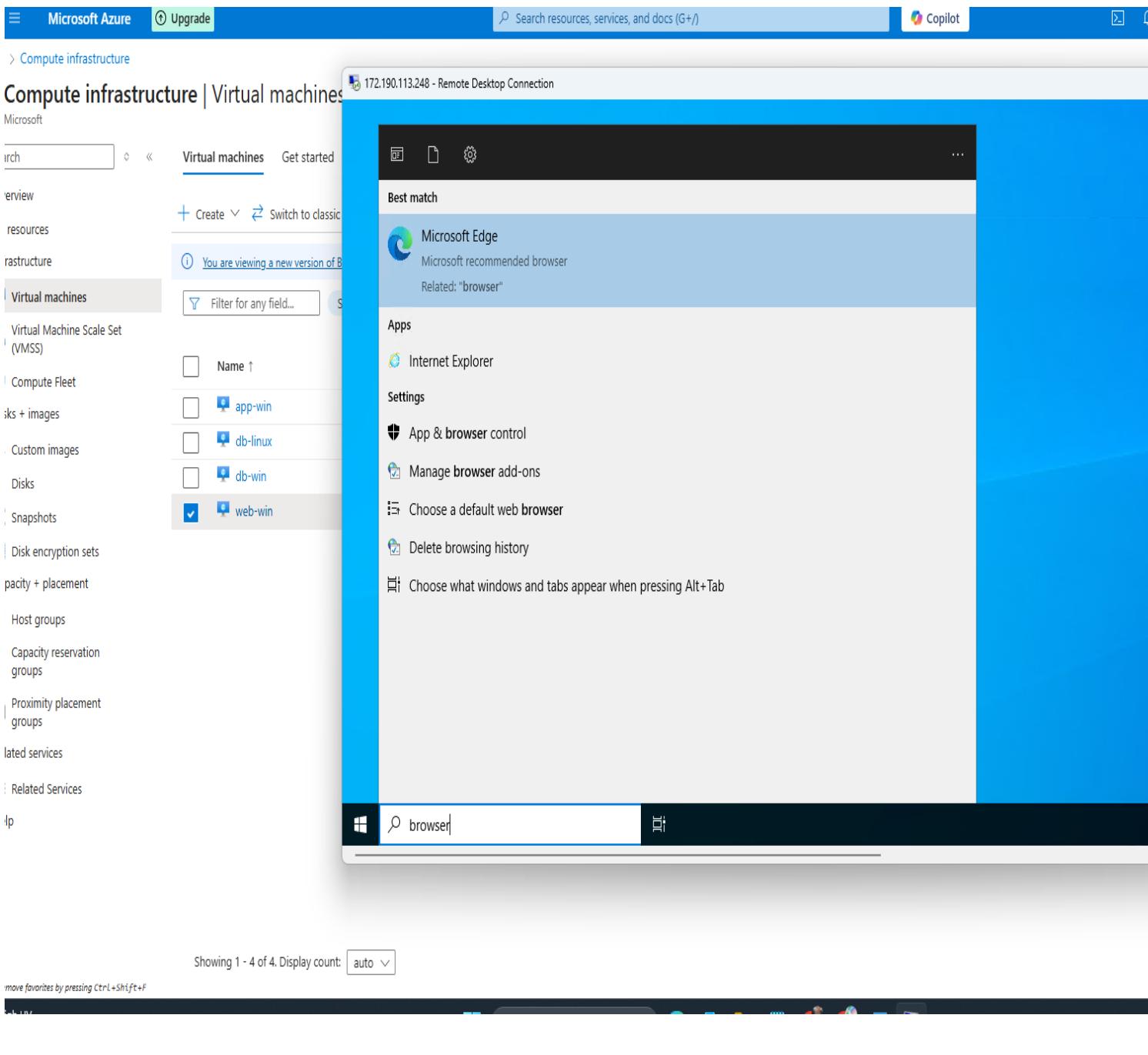
Remote computer: 172.190.113.248

Press Ctrl+C to copy.





Showing 1 - 4 of 4. Display count: ▾



Step 7: Test Tier-to-Tier Access (Connectivity Tests)

Goal:

- Web Tier ↔ App Tier → ✓ Should work
- App Tier ↔ DB Tier → ✓ Should work

- DB Tier → ✗ Cannot access Web or App
 - Only Web Tier should access the internet
-

How to test between VMs

We'll use ping, curl, and RDP/SSH.

Test 1: From web-linux to app-linux

1. SSH into web-linux:

bash

CopyEdit

```
ssh azureuser@<public-ip-of-web-linux>
```

2. Ping app-linux (use private IP from Azure portal):

bash

CopyEdit

```
ping <private-ip-of-app-linux>
```

You should see replies if NSG allows it.

3. Try curl (if Apache is running on app-linux):

bash

CopyEdit

```
curl http://<private-ip-of-app-linux>
```

Test 2: From app-win to db-win

1. RDP into app-win
2. Open Command Prompt

3. Ping DB Windows VM:

cmd

CopyEdit

```
ping <private-ip-of-db-win>
```

You should see successful replies.

Test 3: From db-linux to web-linux

1. SSH into db-linux

2. Try pinging web:

bash

CopyEdit

```
ping <private-ip-of-web-linux>
```

✗ You should NOT get replies if NSG is configured correctly (DB Tier cannot reach Web or App)

Final Architecture Review

Tier	Can Access	Can Be Accessed By	Internet Access
Web Tier	App Tier	Internet, App Tier	<input checked="" type="checkbox"/> Yes
App Tier	Web, DB	Web Tier	<input checked="" type="checkbox"/> No
DB Tier	✗ None	App Tier	<input checked="" type="checkbox"/> No
