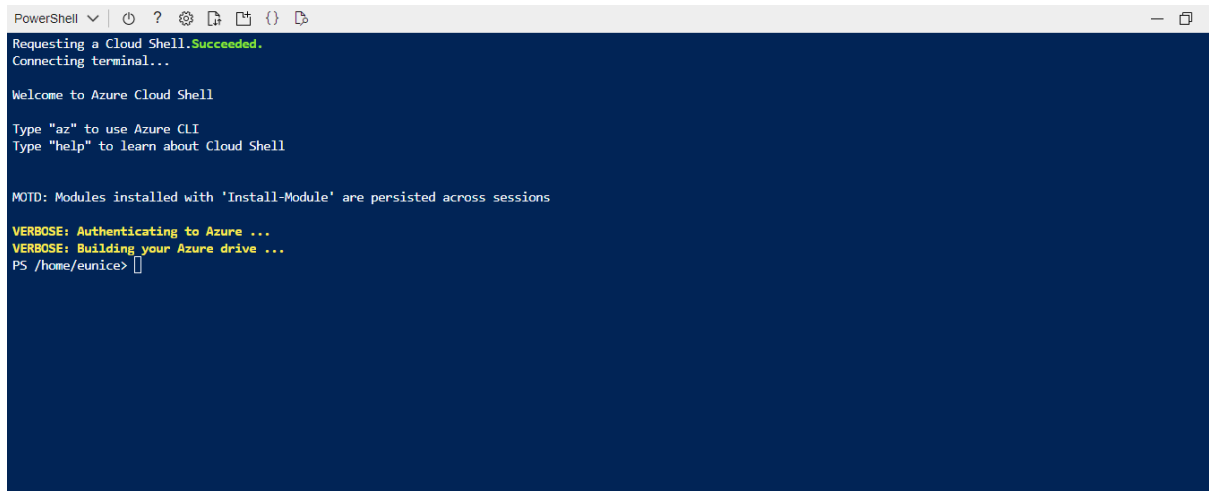


Unit 3 Create and configure a virtual network gateway

Task 1: Create CoreServicesVnet and ManufacturingVnet

1. In the Azure portal, open the PowerShell session within the Cloud Shell pane.



The screenshot shows the Azure Cloud Shell PowerShell interface. The terminal output includes the following text:

```
PowerShell
Requesting a Cloud Shell.Succeeded.
Connecting terminal...

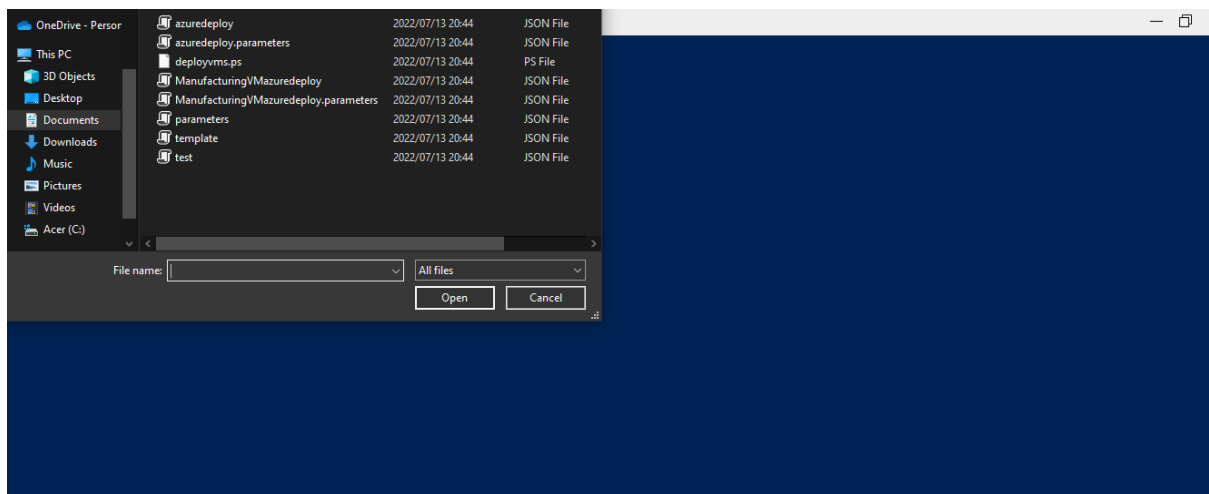
Welcome to Azure Cloud Shell

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

MOTD: Modules installed with 'Install-Module' are persisted across sessions

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/eunice>
```

2. In the toolbar of the Cloud Shell pane, click the Upload/Download files icon, in the drop-down menu, click Upload and upload the following files azuredeploy.json and azuredeploy.parameters.json into the Cloud Shell home directory one by one.



3. Deploy the following ARM templates to create the virtual network and subnets needed for this exercise:

```
Requesting a Cloud Shell.Succeeded.
Connecting terminal...

MOTD: Save files to $home/cloudrive for persistence across sessions

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/eunice> $RGName = "ContosoResourceGroup"
PS /home/eunice> #create resource group if it doesnt exist
PS /home/eunice> New-AzResourceGroup -Name $RGName -Location "eastus"

ResourceGroupNameNew-AzResourceGroupDeployment -ResourceGroupName $RGName -TemplateFile azuredeploy.json -TemplateParameterFile azuredeploy.parameters.json
Location : eastus
ProvisioningState : Succeeded
Tags :
ResourceId : /subscriptions/2a8e3ab1-f621-4dd7-a587-e036a332e9c4/resourceGroups/ContosoResourceGroup

PS /home/eunice> New-AzResourceGroupDeployment -ResourceGroupName $RGName -TemplateFile azuredeploy.json -TemplateParameterFile azuredeploy.param
```

Task 2: Create CoreServicesVM

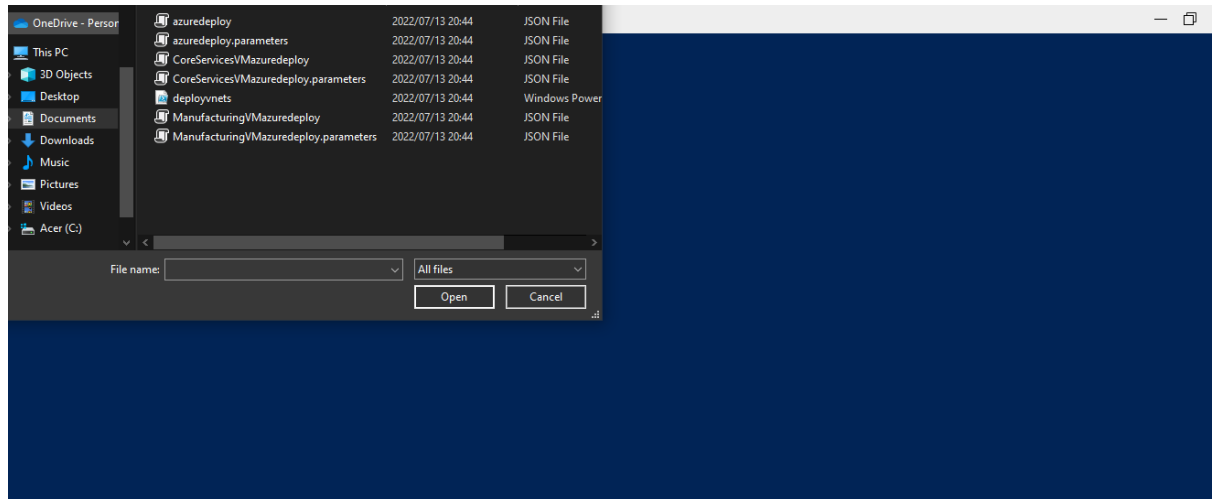
1. In the Azure portal, open the PowerShell session within the Cloud Shell pane.

```
PowerShell | ? | ? | ? | ? | ? | ? | ? | ? | ?
Requesting a Cloud Shell.Succeeded.
Connecting terminal...

MOTD: Discover installed Azure modules: Get-Module Az* -ListAvailable

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/eunice> 
```

2. In the toolbar of the Cloud Shell pane, click the Upload/Download files icon, in the drop-down menu, click Upload and upload the following files CoreServicesVMazuredeploy.json and CoreServicesVMazuredeploy.parameters.json into the Cloud Shell home directory one by one from the source folder F:\Allfiles\Exercises\M02.



3. Deploy the following ARM templates to create the VMs needed for this exercise:

```
requesting a Cloud Shell, succeeded.
Connecting terminal...

NOTD: Modules installed with 'Install-Module' are persisted across sessions

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/eunice> $RGName = "ContosoResourceGroup"
PS /home/eunice>
PS /home/eunice> New-AzResourceGroupDeployment -ResourceGroupName $RGName -TemplateFile CoreServicesVMazuredeploy.json -TemplateParameterFile CoreServicesVMazuredeploy.parameters.json
```

4. When the deployment is complete, go to the Azure portal home page, and then select Virtual Machines. +

5. Verify that the virtual machine has been created.

Virtual machines ✨ ...

Default Directory

+ Create ▾ Switch to classic ⌚ Reservations ▾ ⚙️ Manage view ▾ ↻ Refresh ⬇️ Export to CSV 🔗 Open query | 🏷️ Assign tags ▶ Start ⏪ Restart ☐ Stop 🗑️ Delete ...

Filter for any field... Subscription equals all Type equals all Resource group equals all Location equals all Add filter

No grouping ▾ List view ▾

<input type="checkbox"/> Name ↑↓	Type ↑↓	Subscription ↑↓	Resource group ↑↓	Location ↑↓	Status ↑↓	Operating system ↑↓	Size ↑↓	Public IP
<input type="checkbox"/> CoreServicesVM	Virtual machine	Azure for Students	ContosoResourceGroup	East US	Running	Windows	Standard_DS1_v2	20.231.70

< Previous Page 1 of 1 Next > Showing 1 to 1 of 1 records. Give feedback

Task 3: Create ManufacturingVM

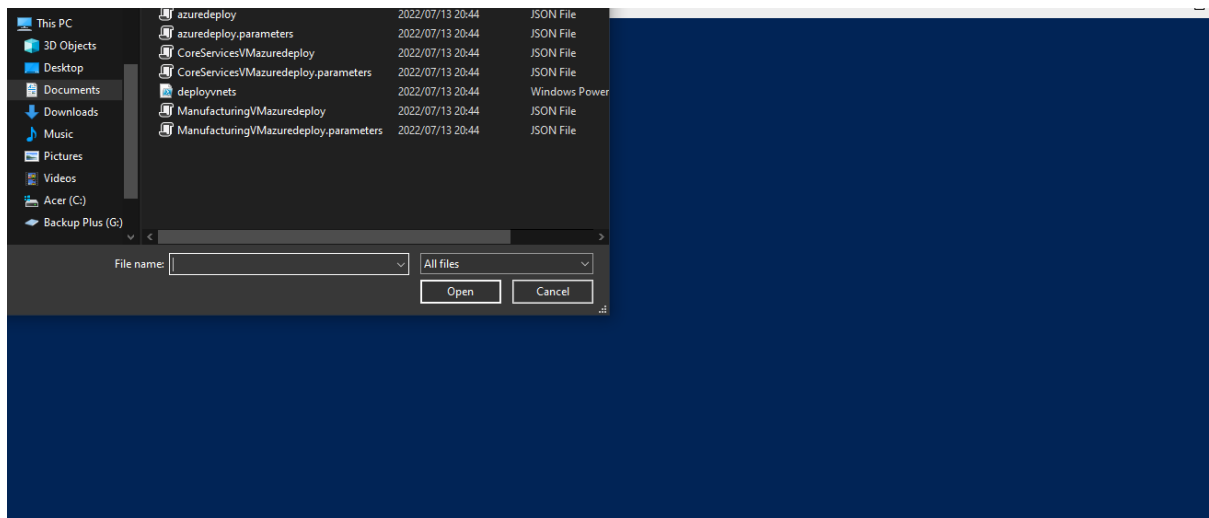
1. In the Azure portal, open the PowerShell session within the Cloud Shell pane.

```
PowerShell | ? ⚙️ 📄 {} 🖨️
Requesting a Cloud Shell.Succeeded.
Connecting terminal...

MOTD: Read more about PowerShell in CloudShell: https://aka.ms/pscloudshell/docs

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/eunice> 
```

2. In the toolbar of the Cloud Shell pane, click the Upload/Download files icon, in the drop-down menu, click Upload and upload the following files ManufacturingVMazuredeploy.json and ManufacturingVMazuredeploy.parameters.json into the Cloud Shell home directory one by one from the source folder F:\Allfiles\Exercises\M02.



3. Deploy the following ARM templates to create the VMs needed for this exercise:

```
PowerShell | ? | ? | ? | ? | ? | ?
Requesting a Cloud Shell.Succeeded.
Connecting terminal...

MOTD: Read more about PowerShell in CloudShell: https://aka.ms/pscloudshell/docs

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/eunice> $RGName = "ContosoResourceGroup"
PS /home/eunice> New-AzResourceGroupDeployment -ResourceGroupName $RGName -TemplateFile ManufacturingVMazuredeploy.json -TemplateParameterFile ManufacturingVMazuredeploy.parameters.json
```

- When the deployment is complete, go to the Azure portal home page, and then select Virtual Machines.

```
PowerShell ? [?] {} L
```

```
MOTD: Read more about PowerShell in CloudShell: https://aka.ms/pscloudshell/docs

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/eunice> $RGName = "ContosoResourceGroup"
PS /home/eunice> 
PS /home/eunice> New-AzResourceGroupDeployment -ResourceGroupName $RGName -TemplateFile ManufacturingVMazuredeploy.json -TemplateParameterFile ManufacturingVMAzureDeploy.parameters.json

DeploymentName      : ManufacturingVMazuredeploy
ResourceGroupName   : ContosoResourceGroup
ProvisioningState    : Succeeded
Timestamp           : 8/5/2022 6:55:43 PM
Mode                : Incremental
TemplateLink         : 
Parameters          : 
                    Name              Type              Value
                    =====
vmName1             String            "ManufacturingVM"
nicName1             String            "ManufacturingVM-nic"
vmSize               String            "Standard_DS1_v2"
adminUsername        String            "TestUser"
adminPassword        SecureString       null

Outputs             : 
DeploymentDebugLogLevel :
```

5. Verify that the virtual machine has been created.



Virtual machines

Default Directory

[+ Create](#)
[↺ Switch to classic](#)
[⌚ Reservations](#)
[⚙️ Manage view](#)
[🔄 Refresh](#)
[⬇️ Export to CSV](#)
[🔗 Open query](#)
[🏷️ Assign tags](#)
[▶ Start](#)
[↺ Restart](#)
[☐ Stop](#)
[🗑️ Delete](#)

Subscription equals all
Type equals all
Resource group equals all
Location equals all
[+ Add filter](#)

No grouping
List view

<input type="checkbox"/> Name ↑↓	Type ↑↓	Subscription ↑↓	Resource group ↑↓	Location ↑↓	Status ↑↓	Operating system ↑↓	Size ↑↓	Public IP
<input type="checkbox"/>  CoreServicesVM	Virtual machine	Azure for Students	ContosoResourceGroup	East US	Running	Windows	Standard_DS1_v2	20.231.70
<input type="checkbox"/>  ManufacturingVM	Virtual machine	Azure for Students	ContosoResourceGroup	West Europe	Running	Windows	Standard_DS1_v2	20.93.148

Task 4: Connect to the Test VMs using RDP

1. On the Azure Portal home page, select Virtual Machines.

Virtual machines ✱ ...

Default Directory

[+ Create](#) [Switch to classic](#) [Reservations](#) [Manage view](#) [Refresh](#) [Export to CSV](#) [Open query](#) [Assign tags](#) [Start](#) [Restart](#) [Stop](#) [Delete](#) ...

[Subscription equals all](#) [Type equals all](#) [Resource group equals all](#) [Location equals all](#) [Add filter](#)

No grouping List view

<input type="checkbox"/>	Name ↑↓	Type ↑↓	Subscription ↑↓	Resource group ↑↓	Location ↑↓	Status ↑↓	Operating system ↑↓	Size ↑↓	Public IP
<input type="checkbox"/>	CoreServicesVM	Virtual machine	Azure for Students	ContosoResourceGroup	East US	Running	Windows	Standard_DS1_v2	20.231.7C
<input type="checkbox"/>	ManufacturingVM	Virtual machine	Azure for Students	ContosoResourceGroup	West Europe	Running	Windows	Standard_DS1_v2	20.93.145

2. Select ManufacturingVM.

Home > Virtual machines >

Virtual machines «

Default Directory

[+ Create](#) [Switch to classic](#) ...

Name ↑↓

- CoreServicesVM
- ManufacturingVM**

ManufacturingVM ✱ ☆ ...

Virtual machine

«

[Connect](#) [Start](#) [Restart](#) [Stop](#) [Capture](#) [Delete](#) [Refresh](#) [Open in mobile](#) ...

Overview

- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems

Settings

- Networking
- Connect
- Windows Admin Center (preview)
- Disks
- Size
- Microsoft Defender for Cloud
- Advisor recommendations
- Extensions + applications

Essentials JSON View

Resource group [\(move\)](#)
[ContosoResourceGroup](#)

Status
Running

Location
West Europe

Subscription [\(move\)](#)
[Azure for Students](#)

Subscription ID
2a8e3ab1-f621-4dd7-a587-e036a332e9c4

Tags [\(edit\)](#)
[Click here to add tags](#)

Operating system
Windows (Windows Server 2019 Datacenter)

Size
Standard DS1 v2 (1 vcpu, 3.5 GiB memory)

Public IP address
[20.93.149.105](#)

Virtual network/subnet
[ManufacturingVnet/ManufacturingSystemSubnet](#)

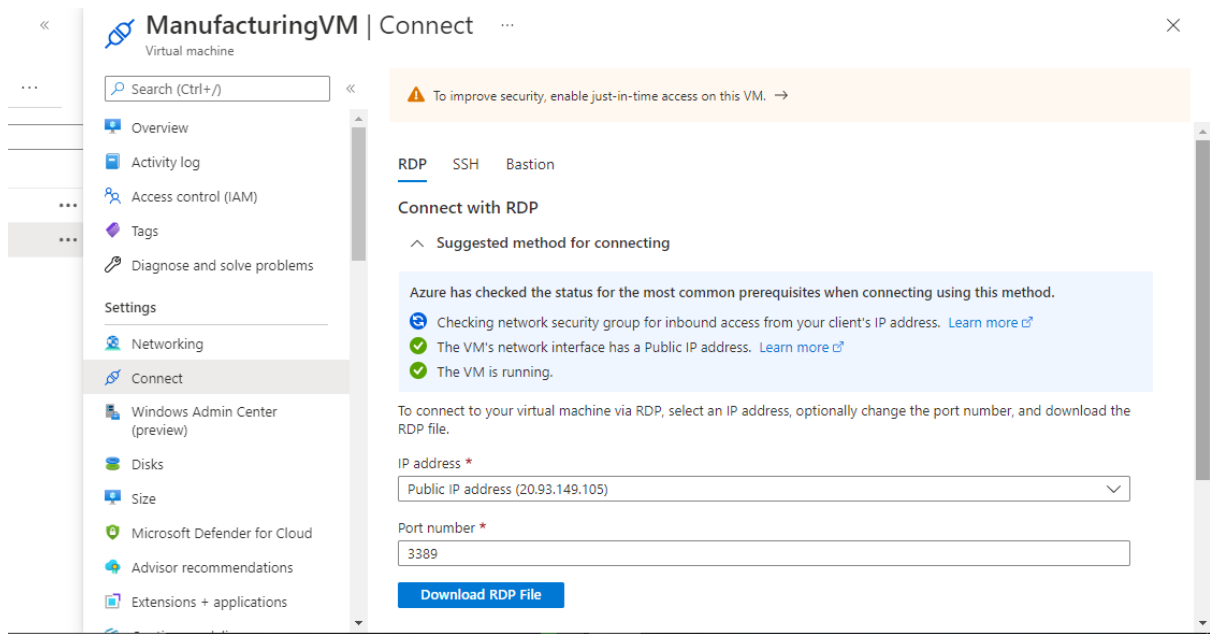
DNS name
[Not configured](#)

Properties [Monitoring](#) [Capabilities \(8\)](#) [Recommendations](#) [Tutorials](#)

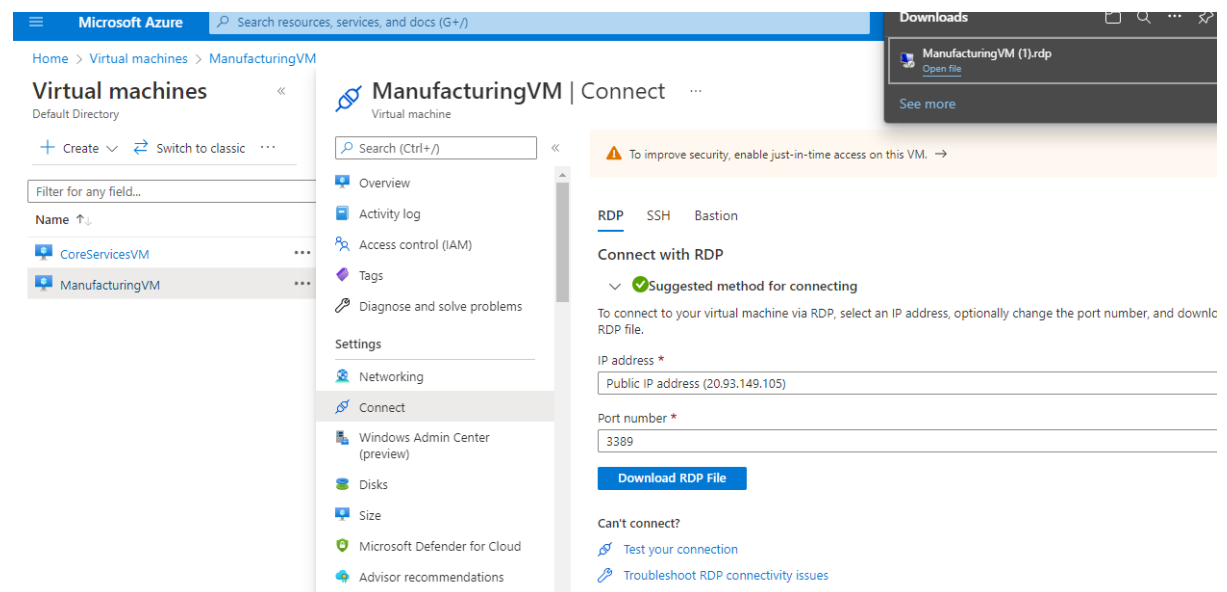
Virtual machine

Computer name
ManufacturingVM

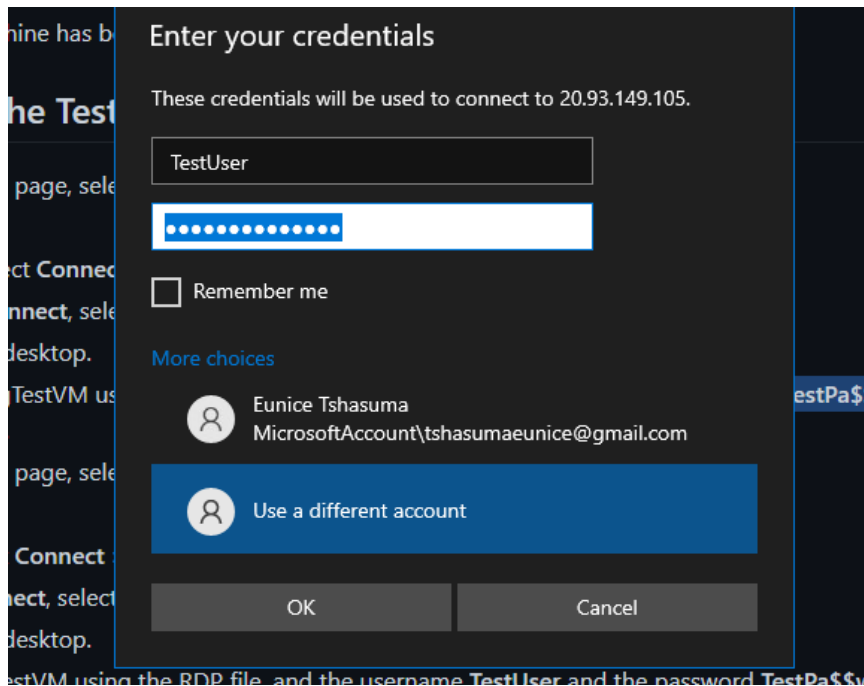
3. In ManufacturingVM, select Connect > RDP.



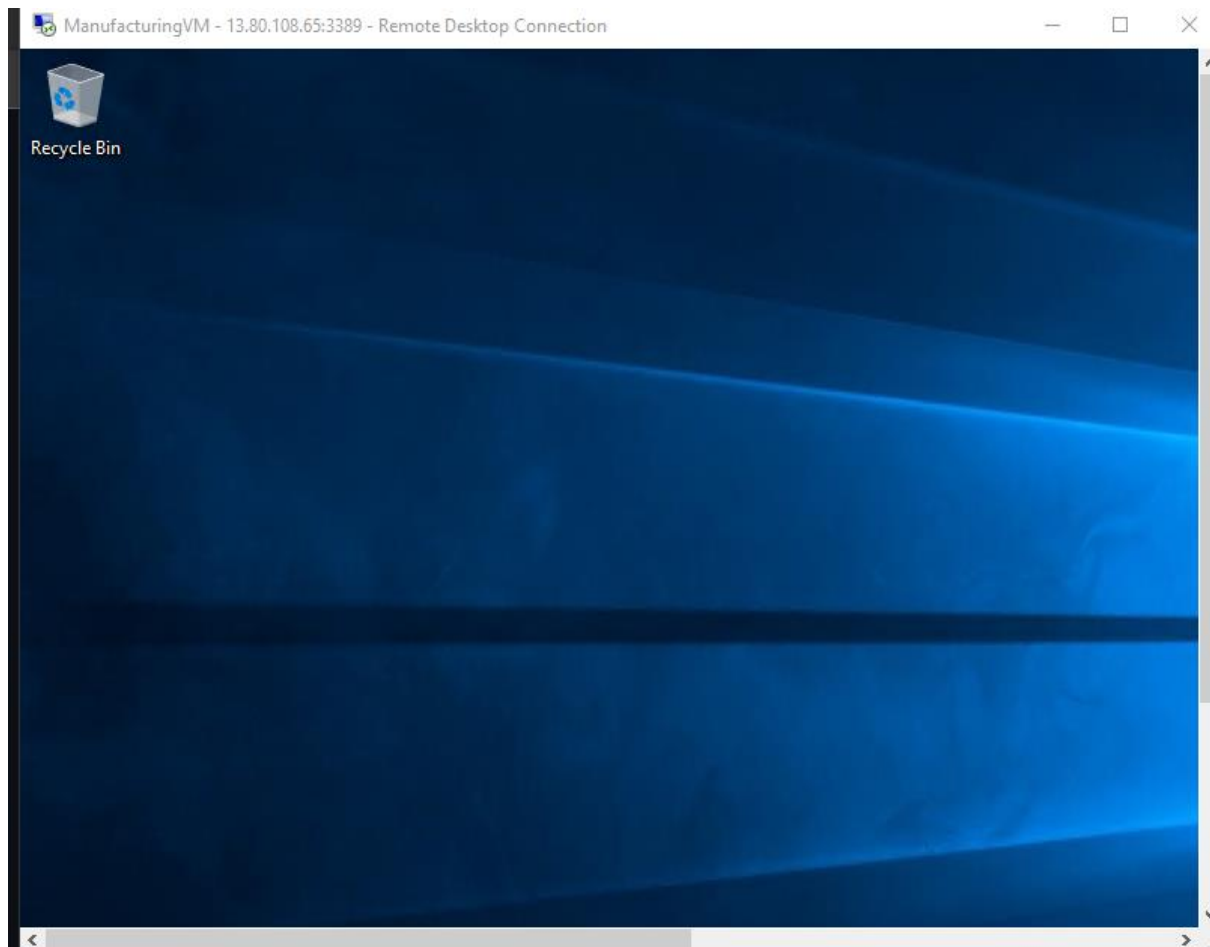
4. In ManufacturingVM | Connect, select Download RDP file.



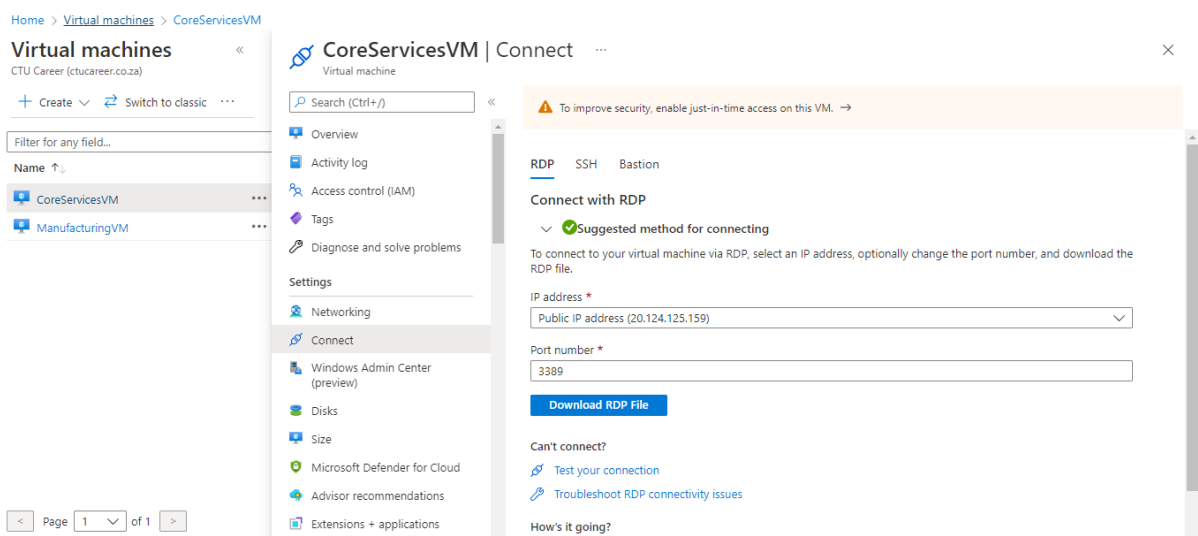
5. Save the RDP file to your desktop. + 6. Connect to ManufacturingTestVM using the RDP file, and the username TestUser and the password TestPa\$\$w0rd!. After connecting, minimize the RDP session.



6. Connect to ManufacturingTestVM using the RDP file, and the username TestUser and the password TestPa\$\$w0rd!. After connecting, minimize the RDP session.



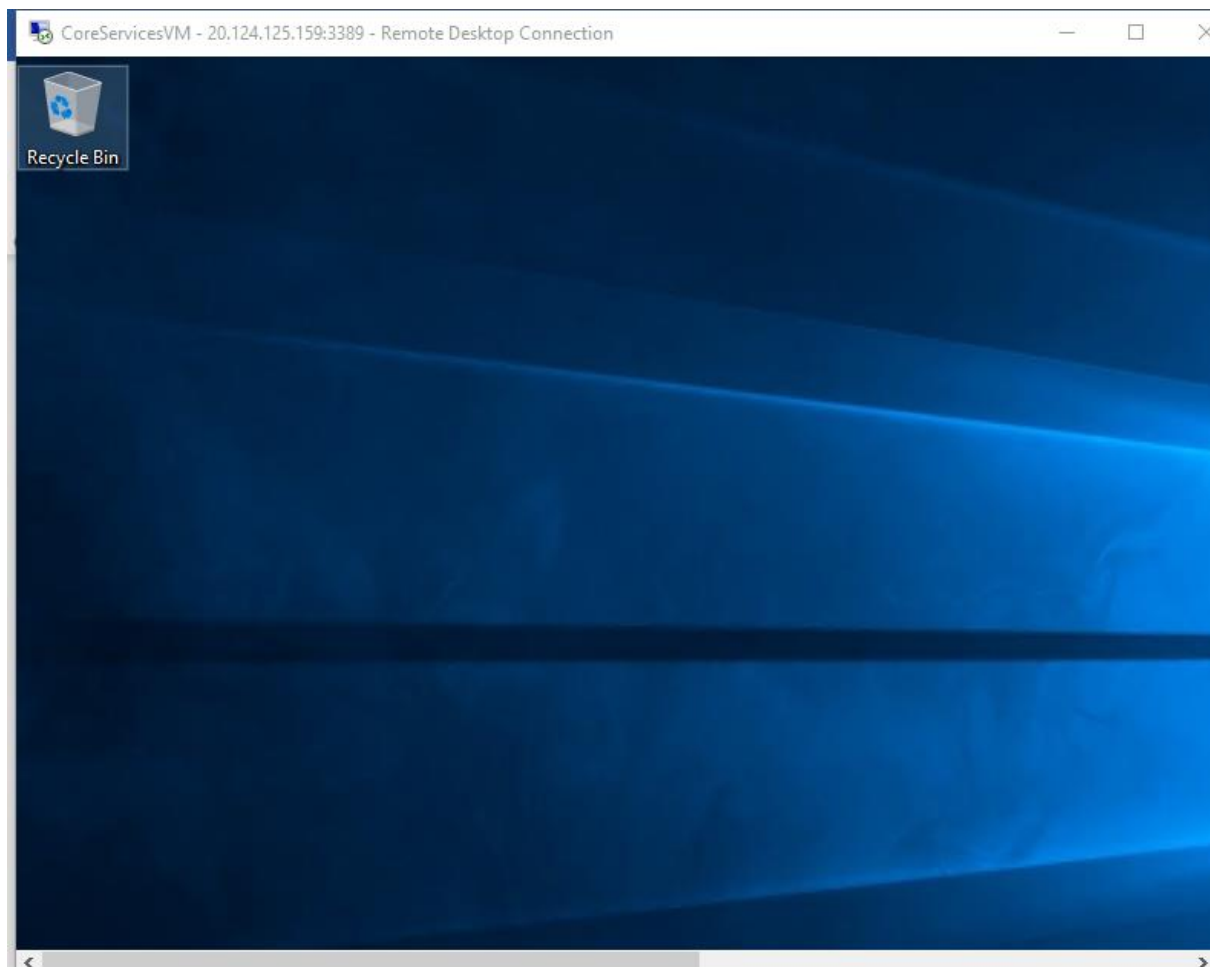
8. Select CoreServicesVM.



9. In CoreServicesVM | Connect, select Download RDP file.

The screenshot shows the 'CoreServicesVM | Connect' page in the AWS Management Console. The left sidebar contains a search bar and a list of navigation options: Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings, Networking, Connect (highlighted), Windows Admin Center (preview), Disks, Size, Microsoft Defender for Cloud, and Advisor recommendations. The main content area has a warning banner at the top: 'To improve security, enable just-in-time access on this VM. →'. Below this, there are tabs for 'RDP', 'SSH', and 'Bastion', with 'RDP' selected. The section is titled 'Connect with RDP' and includes a 'Suggested method for connecting' dropdown. A text box explains: 'To connect to your virtual machine via RDP, select an IP address, optionally change the port number, and download the RDP file.' There are two input fields: 'IP address *' with a dropdown menu showing 'Public IP address (20.231.70.215)' and 'Port number *' with a text box containing '3389'. A blue button labeled 'Download RDP File' is positioned below these fields. At the bottom, under the heading 'Can't connect?', there are two links: 'Test your connection' and 'Troubleshoot RDP connectivity issues'.

10. -11. On both VMs, in Networks, select Yes.



15. On CoreServicesTestVM, open PowerShell, and run the following command: ipconfig

```
CoreServicesVM - 20.124.125.159:3389 - Remote Desktop Connection
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\TestUser> ipconfig

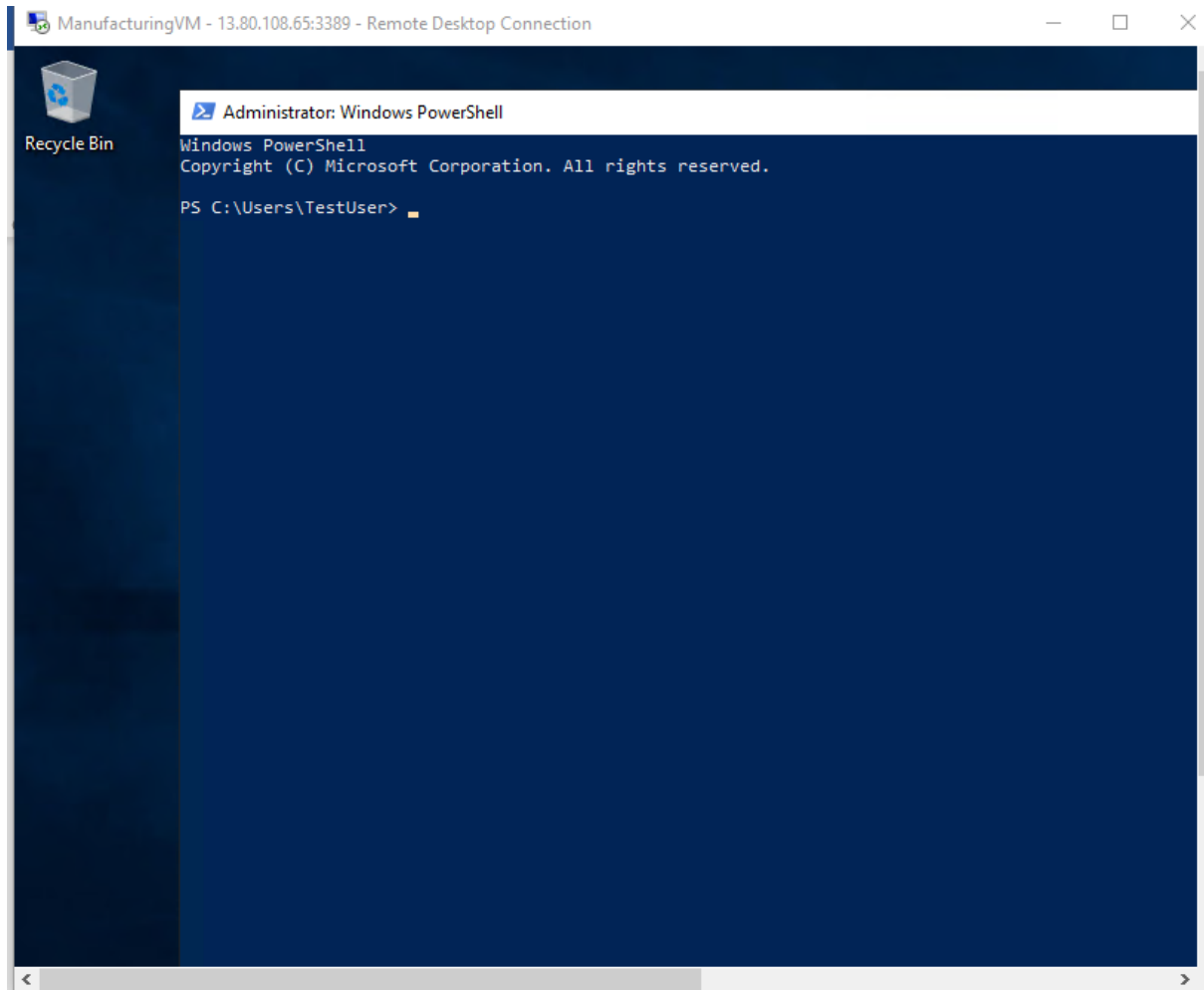
Windows IP Configuration

Ethernet adapter Ethernet:

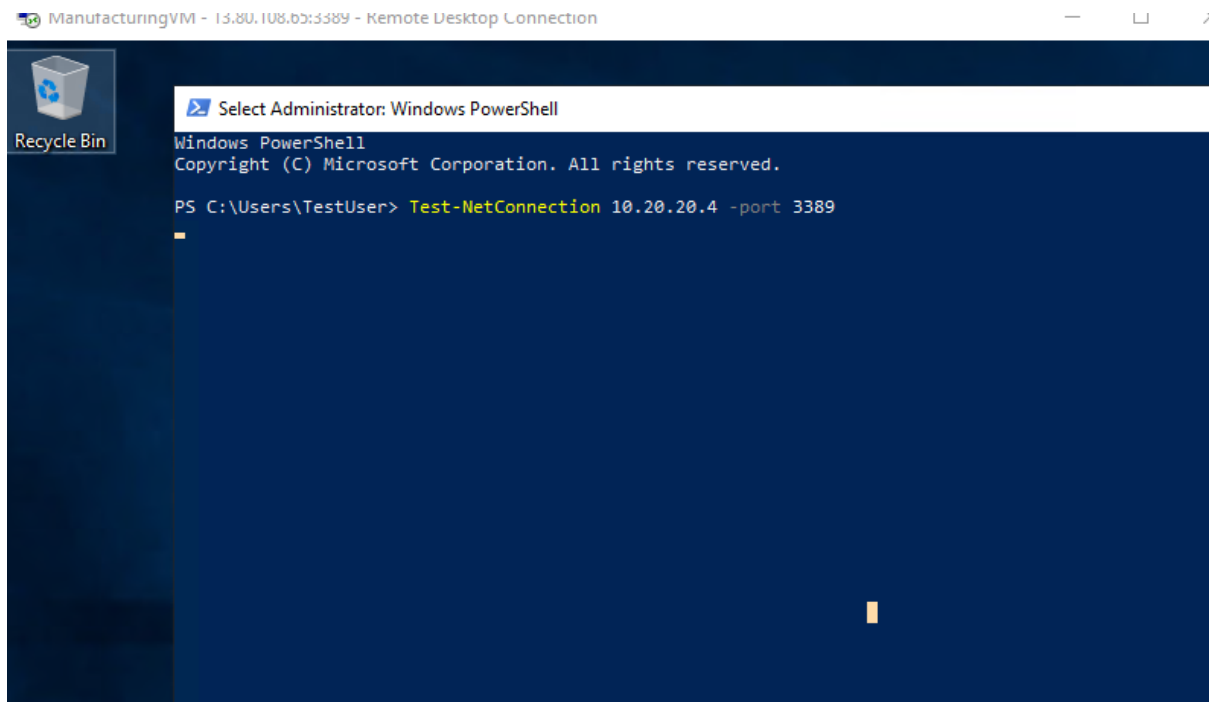
    Connection-specific DNS Suffix  . : gfe4e333o4rexgpy1hxgxdunsf.bx.internal.cloudapp.net
    Link-local IPv6 Address . . . . . : fe80::b929:4d55:6647:5823%3
    IPv4 Address. . . . . : 10.20.20.4
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 10.20.20.1
PS C:\Users\TestUser>
```

Task 5: Test the connection between the VMs

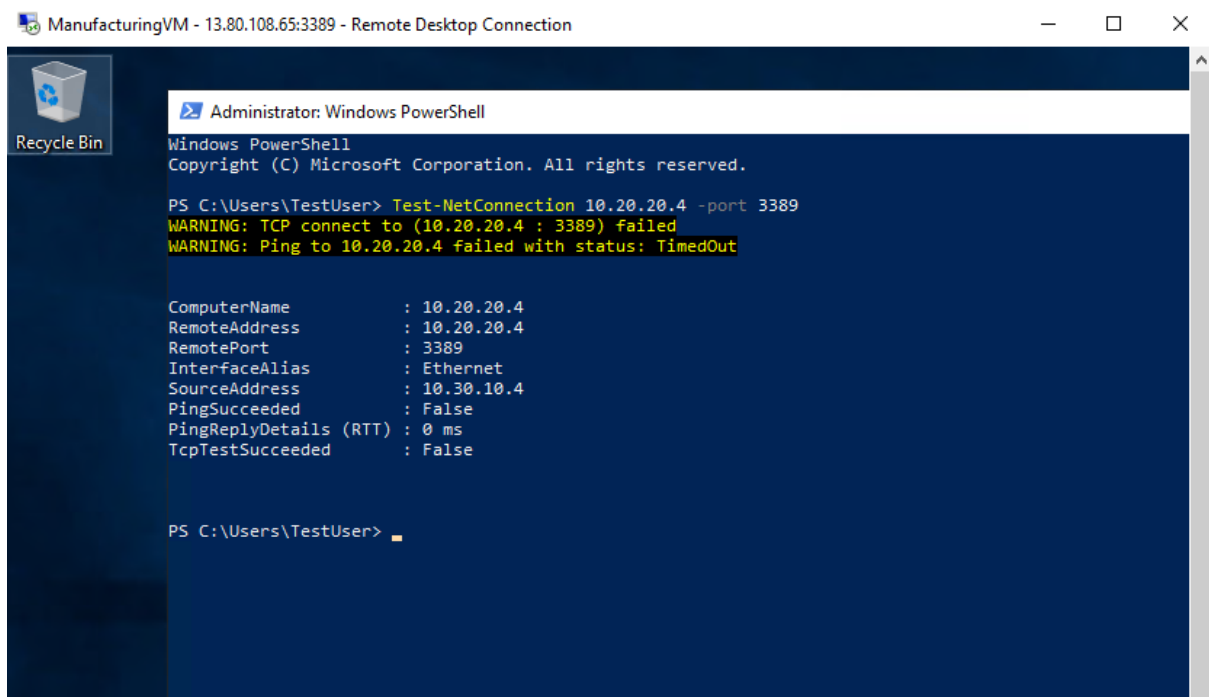
1. On the ManufacturingVM, open PowerShell.



2. Use the following command to verify that there is no connection to CoreServicesVM on CoreServicesVnet. Be sure to use the IPv4 address for CoreServicesVM.



3. The test connection should fail, and you will see a result similar to the following:



Task 6: Create CoreServicesVnet Gateway

1. In Search resources, services, and docs (G+//), enter Virtual network gateway, and then select Virtual network gateways from the results.

Home > Virtual network gateways

CTU Career (ctucareer.co.za)

+ Create Manage view Refresh Export to CSV Open query Assign tags

Filter for an Save the current columns, sorting, filtering and summary as a view and access your saved views here. resource group equals all Location equals all Add filter

No grouping List view

Name	Virtual ...	Gatew...	Resource group	Location	Subscription
------	-------------	----------	----------------	----------	--------------

No virtual network gateways to display

Azure VPN Gateway connects your on-premises networks to Azure through Site-to-Site VPNs in a similar way that you set up and connect to a remote branch office. The connectivity is secure and uses the industry-standard protocols Internet Protocol Security (IPsec) and Internet Key Exchange (IKE).

Create virtual network gateway

2. In Virtual network gateways, select + Create

Home > Virtual network gateways > Create virtual network gateway

Basics Tags Review + create

Azure has provided a planning and design guide to help you configure the various VPN gateway options. [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 for Students

Resource group Select a virtual network to get resource group

Instance details

Name *

Region * East US

Gateway type * VPN ExpressRoute

VPN type * Route-based Policy-based

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

3. Use the information in the following table to create the virtual network gateway:

Home > Virtual network gateways >

Create virtual network gateway ...

Basics Tags Review + create

Azure has provided a planning and design guide to help you configure the various VPN gateway options. [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 for Students

Resource group ⓘ ContosoResourceGroup (derived from virtual network's resource group)

Instance details

Name * CoreServicesVnetGateway

Region * East US

Gateway type * ⓘ ☒ VPN ☐ ExpressRoute

VPN type * ⓘ ☒ Route-based ☐ Policy-based

Home > Virtual network gateways >

Create virtual network gateway ...

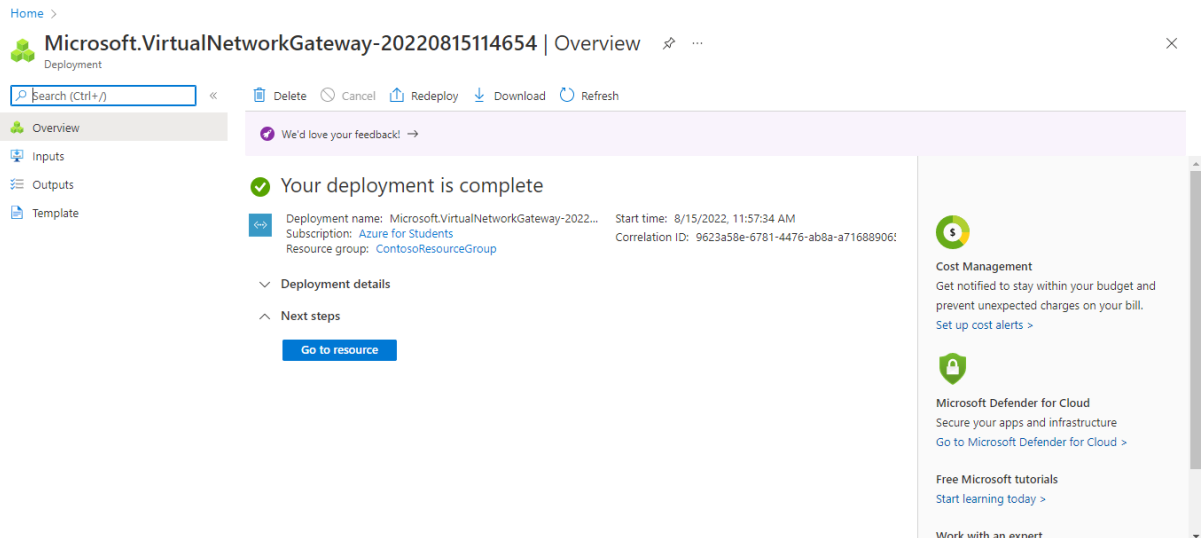
Validation passed

Basics Tags Review + create

Basics

Subscription	Azure for Students
Resource group	ContosoResourceGroup
Name	CoreServicesVnetGateway
Region	East US
SKU	VpnGw1
Generation	Generation1
Virtual network	CoreServicesVnet
Subnet	GatewaySubnet (10.20.0.0/27)
Gateway type	Vpn
VPN type	RouteBased
Enable active-active mode	Disabled
Configure BGP	Disabled

Create Previous Next Download a template for automation



Task 7: Create ManufacturingVnet Gateway

1. In Search resources, services, and docs (G+//), enter Virtual network gateway, and then select Virtual network gateways from the results.
2. In Virtual network gateways, select + Create.

Home > Virtual network gateways > Create virtual network gateway

Basics Tags Review + create

Azure has provided a planning and design guide to help you configure the various VPN gateway options. [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 for Students

Resource group ⓘ Select a virtual network to get resource group

Instance details

Name *

Region * East US

Gateway type * ⓘ ☒ VPN ☐ ExpressRoute

VPN type * ⓘ ☒ Route-based ☐ Policy-based

[Review + create](#) [Previous](#) [Next : Tags >](#) [Download a template for automation](#)

3. Use the information in the following table to create the virtual network gateway:

Create virtual network gateway ...



✓ Validation passed

Basics Tags **Review + create**

Basics

Subscription	Azure for Students
Resource group	ContosoResourceGroup
Name	ManufacturingVnetGateway
Region	West Europe
SKU	VpnGw1
Generation	Generation1
Virtual network	ManufacturingVnet
Subnet	GatewaySubnet (10.30.0.0/27)
Gateway type	Vpn
VPN type	RouteBased
Enable active-active mode	Disabled
Configure BGP	Disabled

Create Previous Next [Download a template for automation](#)

Microsoft.VirtualNetworkGateway-20220815131335 | Overview ...



Search (Ctrl+/) << Delete Cancel Redeploy Download Refresh

Overview

Inputs

Outputs

Template

✓ We'd love your feedback! →

✓ Your deployment is complete

Deployment name: Microsoft.VirtualNetworkGateway-20220... Start time: 8/15/2022, 1:19:42 PM
Subscription: [Azure for Students](#) Correlation ID: b19c514c-9fa8-451f-9027-6fc286919b
Resource group: [ContosoResourceGroup](#)

▼ Deployment details

^ Next steps

[Go to resource](#)



Cost Management

Get notified to stay within your budget and prevent unexpected charges on your bill.
[Set up cost alerts >](#)



Microsoft Defender for Cloud

Secure your apps and infrastructure
[Go to Microsoft Defender for Cloud >](#)

Free Microsoft tutorials

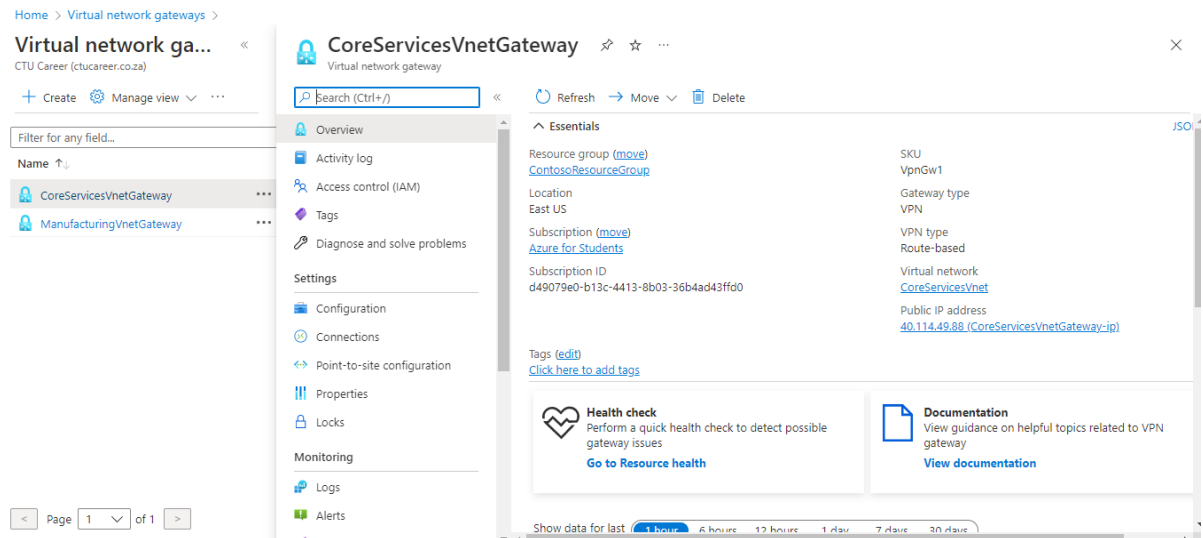
[Start learning today >](#)

[Work with an expert](#)

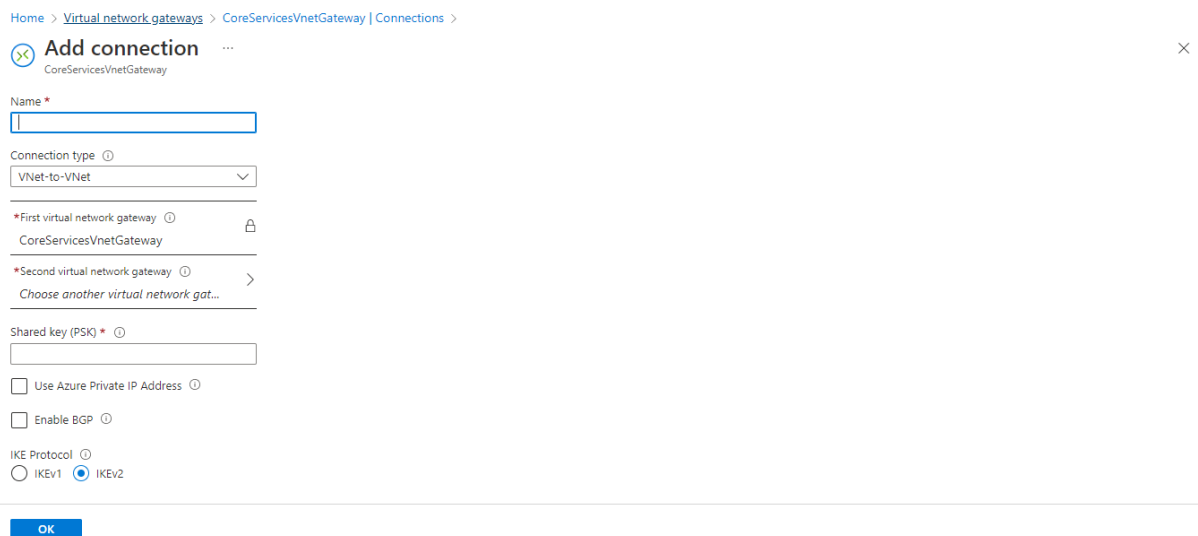
Task 8: Connect CoreServicesVnet to ManufacturingVnet

1. In Search resources, services, and docs (G+), enter Virtual network gateway, and then select Virtual network gateways from the results.

2. In Virtual network gateways, select CoreServicesVnetGateway.



3. In CoreServicesGateway, select Connections, and then select + Add.



4. Use the information in the following table to create the connection:

Home > Virtual network gateways > CoreServicesVnetGateway | Connections >

Add connection

Name *
CoreServicesGW-to-ManufacturingGW ✓

Connection type ⓘ
VNet-to-VNet

*First virtual network gateway ⓘ
CoreServicesVnetGateway

*Second virtual network gateway ⓘ
ManufacturingVnetGateway

Shared key (PSK) * ⓘ
jbc123 ✓

☐ Use Azure Private IP Address ⓘ

☐ Enable BGP ⓘ

IKE Protocol ⓘ
☐ IKEv1 ☒ IKEv2

5. To create the connection, select OK.

Home > Virtual network gateways > CoreServicesVnetGateway

Virtual network gateway

CTU Career (ctucareer.co.za)

+ Create ⚙️ Manage view ⌵ ...

Filter for any field...

Name ↑↓
CoreServicesVnetGateway ...
ManufacturingVnetGateway ...

< Page 1 of 1 >

CoreServicesVnetGateway | Connections

- Search (Ctrl+/)
- Overview
 - Activity log
 - Access control (IAM)
 - Tags
 - Diagnose and solve problems
 - Settings
 - Configuration
 - Connections
 - Point-to-site configuration
 - Properties
 - Locks
 - Monitoring
 - Logs
 - Alerts

+ Add ↻ Refresh

Search connections

Name	↑↓	Status	↑↓	Connection type	↑↓	Peer	↑↓
CoreServicesGW-to-Manuf...		Unknown		VNet-to-VNet		ManufacturingVnetGateway ...	

Task 9: Connect ManufacturingVnet to CoreServicesVnet

1. In Search resources, services, and docs (G+//), enter Virtual network gateway, and then select Virtual network gateways from the result
2. In Virtual network gateways, select ManufacturingVnetGateway.

[Home](#) > [Virtual network gateways](#) > [ManufacturingVnetGateway](#) | [Connections](#) >

Add connection ...

ManufacturingVnetGateway

Name *

Connection type ⓘ

VNet-to-VNet

*First virtual network gateway ⓘ

ManufacturingVnetGateway

*Second virtual network gateway ⓘ

Choose another virtual network gat... >

Shared key (PSK) * ⓘ

☐ Use Azure Private IP Address ⓘ

☐ Enable BGP ⓘ

IKE Protocol ⓘ

☐ IKEv1 ☒ IKEv2

OK

4. Use the information in the following table to create the connection:

5.To create the connection, select OK.

Home > Virtual network gateways > ManufacturingVnetGateway

Virtual network gateway

CTU Career (ctucareer.co.za)

+ Create ⚙️ Manage view ▾ ⋮

Filter for any field...

Name ↑↓
CoreServicesVnetGateway ...
ManufacturingVnetGateway ...

Search (Ctrl+/) ⋮

+ Add ↻ Refresh

Search connections

Name	↑↓ Status	↑↓ Connection type	↑↓ Peer	↑↓
CoreServicesGW-to-Manuf...	Not connected	VNet-to-VNet	CoreServicesVnetGateway	...
ManufacturingGW-to-Core...	Unknown	VNet-to-VNet	CoreServicesVnetGateway	...

Overview
Activity log
Access control (IAM)
Tags
Diagnose and solve problems

Settings

Configuration

Connections

Point-to-site configuration

Properties

Locks

Monitoring

Logs

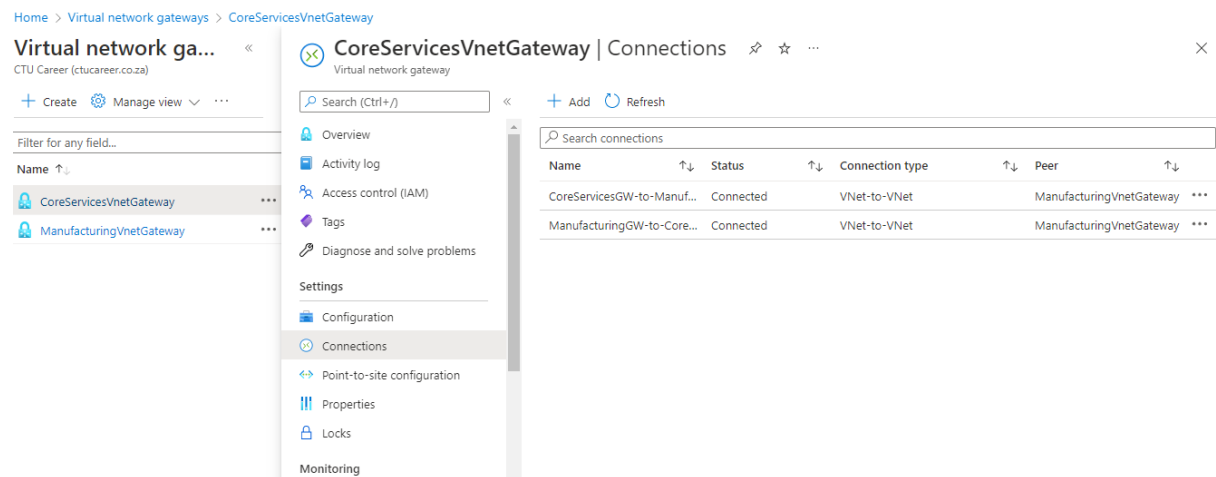
Alerts

Metrics

< Page 1 of 1 >

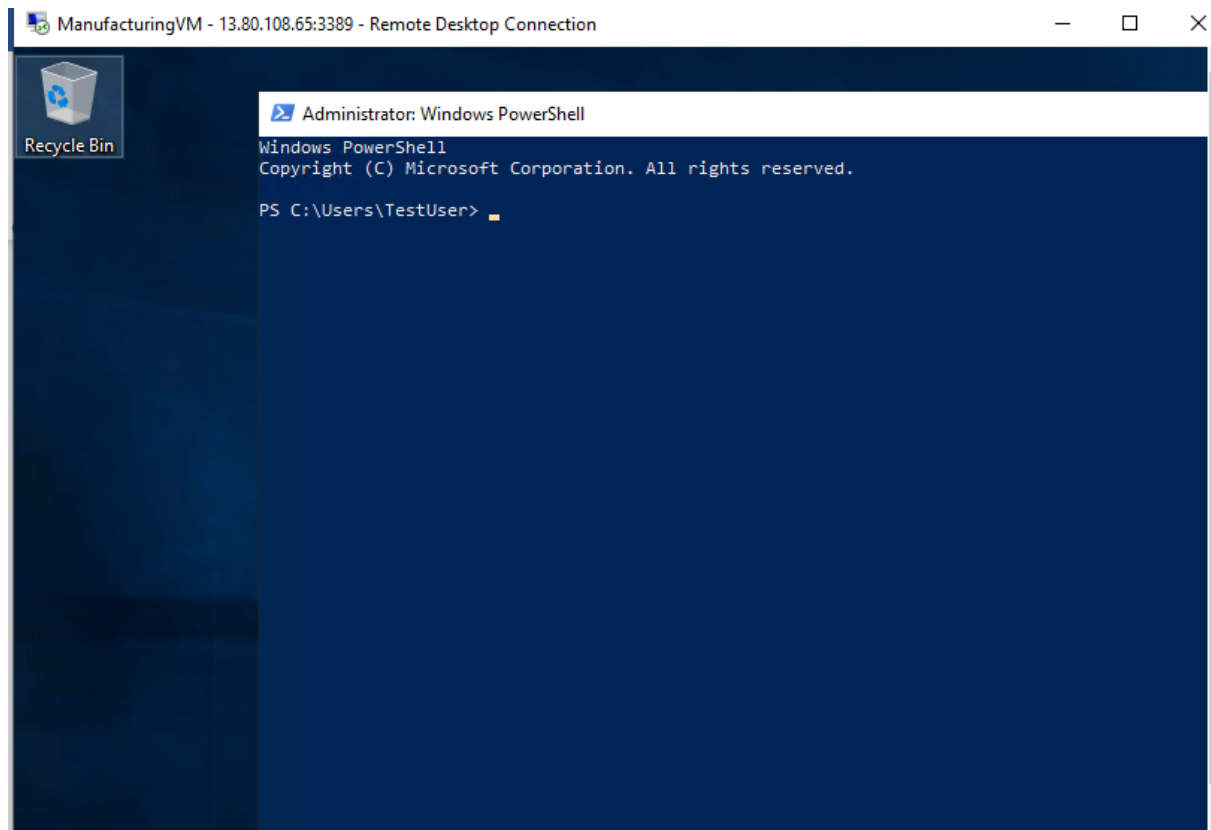
Task 10: Verify that the connections connect

1. In Search resources, services, and docs (G+//), enter connections, and then select connections from the results.
2. Wait until the status of both connections is Connected. You may need to refresh your screen.

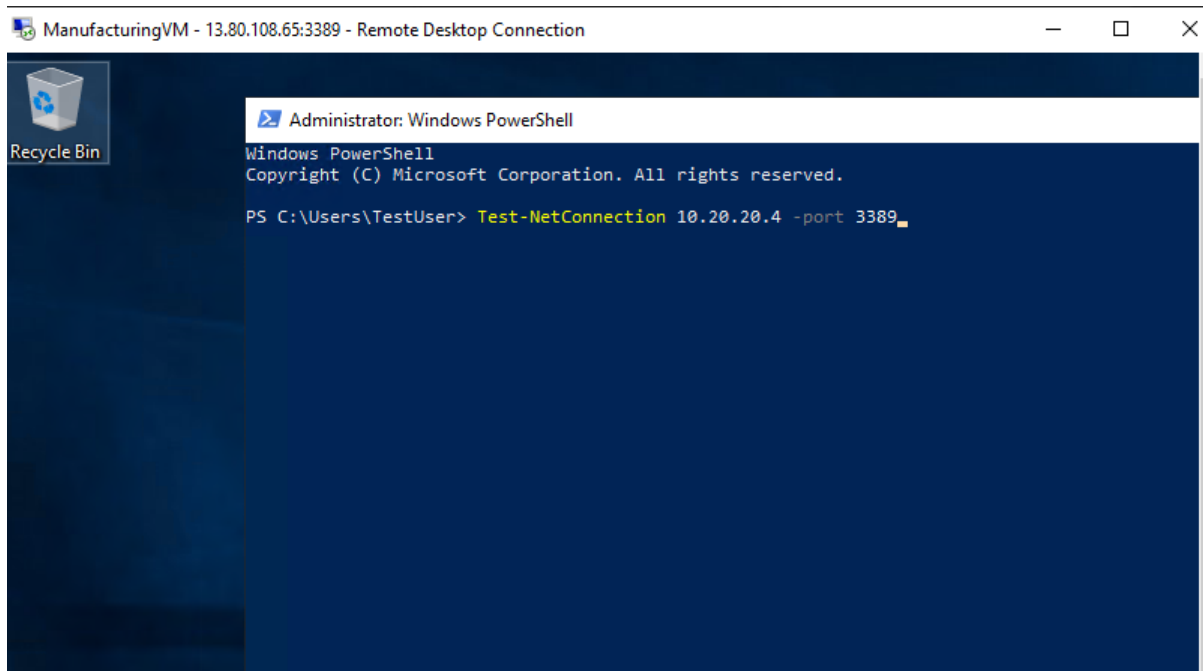


Task 11: Test the connection between the VMs

1. On the ManufacturingVM, open PowerShell.



2. Use the following command to verify that there is now a connection to CoreServicesVM on CoreServicesVnet. Be sure to use the IPv4 address for CoreServicesVM.



3. The test connection should succeed, and you will see a result similar to the following:

