

# How to create a Linux Virtual Machine (Ubuntu Server) with Azure SDK for .NET. After creating the VM we will install VSCode, Google Chrome and .NET 8

---

**NOTE:** for more information about VM with Azure SDK for .NET visit the URL

[https://github.com/Azure/azure-sdk-for-net/blob/main/sdk/compute/Azure.ResourceManager.Compute/samples/Sample2\\_ManagingVirtualMachines.md](https://github.com/Azure/azure-sdk-for-net/blob/main/sdk/compute/Azure.ResourceManager.Compute/samples/Sample2_ManagingVirtualMachines.md)

## 0. Prerequisites

---

Install .NET 8 SDK: <https://dotnet.microsoft.com/en-us/download/dotnet/8.0>

Install Azure CLI: <https://learn.microsoft.com/en-us/cli/azure/install-azure-cli>

Install VSCode: <https://code.visualstudio.com/download>

## 1. Create a new C# console .Net 8 application in VSCode

---

Open VSCode and run the command:

```
dotnet new console --framework net8.0
```

## 2. Load the Azure SDK libraries.

---

From the Nuget web page copy the commands to load the libraries: <https://www.nuget.org/>

Run these commands to load the libraries:

```
dotnet add package Azure.Identity --version 1.10.4
dotnet add package Azure.ResourceManager --version 1.9.0
dotnet add package Azure.ResourceManager.Network --version 1.6.0
dotnet add package Azure.ResourceManager.Compute --version 1.2.1
```

Now run the command:

```
dotnet restore
```

### 3. Input the C# source code.

---

```
using System;
using System.Threading.Tasks;
using Azure;
using Azure.Core;
using Azure.Identity;
using Azure.ResourceManager;
using Azure.ResourceManager.Network.Models;
using Azure.ResourceManager.Network;
using Azure.ResourceManager.Resources;
using Azure.ResourceManager.Resources.Models;
using Azure.ResourceManager.Compute;
using Azure.ResourceManager.Compute.Models;

class Program
{
    static async Task Main(string[] args)
    {
        ArmClient armClient = new ArmClient(new DefaultAzureCredential());
        SubscriptionResource subscription = await armClient.GetDefaultSubscriptionAsync();
```

```
ResourceGroupCollection rgCollection = subscription.GetResourceGroups();
string rgName = "myRgName";
AzureLocation location = AzureLocation.WestEurope;
ResourceGroupResource resourceGroup = await rgCollection.CreateOrUpdate(WaitUntil.Started, rgName, new ResourceGroupData(

PublicIPAddressCollection publicIPAddressCollection = resourceGroup.GetPublicIPAddresses();
string publicIPAddressName = "20.61.0.157";
PublicIPAddressData publicIPInput = new PublicIPAddressData()
{
    Location = resourceGroup.Data.Location,
    PublicIPAllocationMethod = NetworkIPAllocationMethod.Dynamic,
    DnsSettings = new PublicIPAddressDnsSettings()
    {
        DomainNameLabel = "mydomain12319741999"
    }
};
PublicIPAddressResource publicIPAddress = await publicIPAddressCollection.CreateOrUpdate(WaitUntil.Completed, publicIPAdd

VirtualNetworkCollection virtualNetworkCollection = resourceGroup.GetVirtualNetworks();
string vnetName = "myVnet";
VirtualNetworkData input = new VirtualNetworkData()
{
    Location = resourceGroup.Data.Location,
    AddressPrefixes = { "10.0.0.0/16", },
    DhcpOptionsDnsServers = { "10.1.1.1", "10.1.2.4" },
    Subnets = { new SubnetData() { Name = "mySubnet", AddressPrefix = "10.0.1.0/24", } }
};
VirtualNetworkResource vnet = await virtualNetworkCollection.CreateOrUpdate(WaitUntil.Completed, vnetName, input).WaitFor

VirtualNetworkCollection virtualNetworkCollection1 = resourceGroup.GetVirtualNetworks();
VirtualNetworkResource virtualNetwork1 = await virtualNetworkCollection1.GetAsync("myVnet");
Console.WriteLine(virtualNetwork1.Data.Name);

NetworkInterfaceCollection networkInterfaceCollection = resourceGroup.GetNetworkInterfaces();
string networkInterfaceName = "myNetworkInterface";
NetworkInterfaceData networkInterfaceInput = new NetworkInterfaceData()
```

```

{
    Location = resourceGroup.Data.Location,
    IPConfigurations = {
        new NetworkInterfaceIPConfigurationData()
        {
            Name = "ipConfig",
            PrivateIPAllocationMethod = NetworkIPAllocationMethod.Dynamic,
            PublicIPAddress = new PublicIPAddressData()
            {
                Id = publicIPAddress.Id
            },
            Subnet = new SubnetData()
            {
                Id = virtualNetwork1.Data.Subnets[0].Id
            }
        }
    }
};

NetworkSecurityGroupCollection nsgCollection = resourceGroup.GetNetworkSecurityGroups();
string nsgName = "myNetworkSecurityGroup";
NetworkSecurityGroupData nsgInput = new NetworkSecurityGroupData()
{
    Location = resourceGroup.Data.Location,
    SecurityRules =
    {
        new SecurityRuleData()
        {
            Name = "AllowSSH",
            Priority = 100,
            Access = SecurityRuleAccess.Allow,
            Direction = SecurityRuleDirection.Inbound,
            Protocol = SecurityRuleProtocol.Tcp,
            SourceAddressPrefix = "*",
            SourcePortRange = "*",
            DestinationAddressPrefix = "*",
            DestinationPortRange = "22", // SSH port
        }
    }
};

```

```
    },  
    new SecurityRuleData()  
    {  
        Name = "AllowHTTP",  
        Priority = 110,  
        Access = SecurityRuleAccess.Allow,  
        Direction = SecurityRuleDirection.Outbound,  
        Protocol = SecurityRuleProtocol.Tcp,  
        SourceAddressPrefix = "*",  
        SourcePortRange = "*",  
        DestinationAddressPrefix = "*",  
        DestinationPortRange = "80", // HTTP port  
    },  
    new SecurityRuleData()  
    {  
        Name = "AllowHTTPS",  
        Priority = 120,  
        Access = SecurityRuleAccess.Allow,  
        Direction = SecurityRuleDirection.Outbound,  
        Protocol = SecurityRuleProtocol.Tcp,  
        SourceAddressPrefix = "*",  
        SourcePortRange = "*",  
        DestinationAddressPrefix = "*",  
        DestinationPortRange = "443", // HTTPS port  
    },  
    new SecurityRuleData()  
    {  
        Name = "AllowRDP",  
        Priority = 130,  
        Access = SecurityRuleAccess.Allow,  
        Direction = SecurityRuleDirection.Inbound,  
        Protocol = SecurityRuleProtocol.Tcp,  
        SourceAddressPrefix = "*",  
        SourcePortRange = "*",  
        DestinationAddressPrefix = "*",  
        DestinationPortRange = "3389", // RDP port  
    }  
}
```

```

    }
};

NetworkSecurityGroupResource nsg = await nsgCollection.CreateOrUpdate(WaitUntil.Completed, nsgName, nsgInput).WaitForComp

networkInterfaceInput.NetworkSecurityGroup = new NetworkSecurityGroupData()
{
    Id = nsg.Id
};

NetworkInterfaceResource networkInterface = await networkInterfaceCollection.CreateOrUpdate(WaitUntil.Completed, networkI

VirtualMachineCollection vmCollection = resourceGroup.GetVirtualMachines();
string vmName = "myVM";
string adminusername = "azureuser";
VirtualMachineData input2 = new VirtualMachineData(resourceGroup.Data.Location)
{
    HardwareProfile = new VirtualMachineHardwareProfile()
    {
        VmSize = VirtualMachineSizeType.StandardE2SV3
    },
    OSProfile = new VirtualMachineOSProfile()
    {
        AdminUsername = adminusername,
        ComputerName = "myVM",
        CustomData = Convert.ToBase64String(System.Text.Encoding.UTF8.GetBytes(
            "#cloud-config\n" +
            "write_files:\n" +
            "  - path: /etc/systemd/resolved.conf\n" +
            "    content: |\n" +
            "      [Resolve]\n" +
            "      DNS=8.8.8.8 8.8.4.4\n" +
            "runcmd:\n" +
            "  - systemctl restart systemd-resolved\n"
        )),
        LinuxConfiguration = new LinuxConfiguration()
    {

```

```

DisablePasswordAuthentication = true,
SshPublicKeys = {
    new SshPublicKeyConfiguration()
    {
        Path = $"/home/" + adminusername + "/.ssh/authorized_keys",
        KeyData = "ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQGC62swVPqUSWDldLCH/Ue1aV5hBQ7K2UjumZcV0+B4qjL3mCgN2oB
    }
}
},
NetworkProfile = new VirtualMachineNetworkProfile()
{
    NetworkInterfaces =
    {
        new VirtualMachineNetworkInterfaceReference()
        {
            Id = new ResourceIdentifier($"/subscriptions/{subscription.Data.SubscriptionId}/resourceGroups/{rgName}/p
            Primary = true,
        }
    }
},
StorageProfile = new VirtualMachineStorageProfile()
{
    OSDisk = new VirtualMachineOSDisk(DiskCreateOptionType.FromImage)
    {
        OSType = SupportedOperatingSystemType.Linux,
        Caching = CachingType.ReadWrite,
        ManagedDisk = new VirtualMachineManagedDisk()
        {
            StorageAccountType = StorageAccountType.StandardLrs
        }
    },
    ImageReference = new ImageReference()
    {
        Publisher = "Canonical",
        Offer = "0001-com-ubuntu-server-jammy",
        Sku = "22_04-lts-gen2",
    }
}
}

```

```
        Version = "latest",  
    }  
}  
};  
  
ArmOperation<VirtualMachineResource> lro = await vmCollection.CreateOrUpdateAsync(WaitUntil.Completed, vmName, input2);  
VirtualMachineResource vm = lro.Value;  
}  
}
```

## 4. Create a new SSH key pair in Azure Portal

The screenshot shows the Microsoft Azure portal interface. At the top, there's a blue header with the 'Microsoft Azure' logo and a search bar. Below the header, the left sidebar contains navigation icons. The main content area is titled 'SSH keys' and shows the user's account 'particular (luiscocoenriquezhotmail.onmicrosoft.com)'. A red box highlights the '+ Create' button. Other buttons like 'Manage view', 'Refresh', 'Export to CSV', 'Open query', and 'Assign tags' are visible. Below the buttons, there's a filter bar with a text input 'Filter for any field...' and three filter buttons: 'Subscription equals all', 'Resource group equals all', and 'Location equals all'. The status 'Showing 1 to 1 of 1 records.' is displayed. At the bottom, there's a table header with 'Name' and 'Type' columns, each with a sort arrow.



[Home](#) > [SSH keys](#) >

# Create an SSH key ...

**Basics**[Tags](#)[Review + create](#)

Creating an SSH key resource allows you to manage and use public keys stored in Azure with Linux virtual machines.

[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 \* ⓘ

mysshkeyRG

[Create new](#)

## Instance details

Region ⓘ

(Europe) West Europe

Key pair name \*

myNewSSHkey1974

SSH public key source

Generate new key pair



**Review + create**

[< Previous](#)

**Next : Tags >**

[Home](#) > [SSH keys](#) >


# Create an SSH key ...

✓ Validation passed

Basics Tags Review + create

## Basics

Subscription	Azure subscription 1
Resource group	mysshkeyRG
Region	West Europe
Key pair name	myNewSSHkey1974



Create

< Previous

Next >

Download a template for automation

Microsoft Azure

Search resources, services, and docs (G+ /)

>> Home > SSH keys >

Create an SSH key ...

✓ Validation passed

BasicsTagsReview + create

Basics

Subscription	Azure subscription 1
Resource group	mysshkeyRG
Region	West Europe
Key pair name	myNewSSHkey1974

Generate new key pair

An SSH key pair contains both a public key and a private key. **Azure doesn't store the private key.** After the SSH key resource is created, you won't be able to download the private key again. [Learn more](#)

Download private key and create resource

Return to create an SSH key resource

The PUBLIC key is available in the SSH key pair Azure resource

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes the 'Microsoft Azure' logo, a search bar, and user information for 'luiscoenriquez@hotmail.com'. The left sidebar contains navigation links for Home, Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings, Properties, Locks, Automation, Tasks (preview), Export template, and Help. The main content area displays the details for the SSH key resource 'myNewSSHkey1974'. The 'Essentials' section shows the resource group 'mysshkeyRG', location 'West Europe', subscription 'Azure\_subscription\_1', and subscription ID '846901e6-da09-45c8-98ca-7cca2353ff0e'. The 'Public key' section shows the key format 'ssh-rsa' and the public key text, which is a long alphanumeric string. A download icon is visible next to the public key text.

Microsoft Azure

Search resources, services, and docs (G+)

Home >

myNewSSHkey1974  
SSH key

Search

Delete Refresh

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Properties

Locks

Automation

Tasks (preview)

Export template

Help

Essentials

Resource group (move) : mysshkeyRG

Location : West Europe

Subscription (move) : Azure\_subscription\_1

Subscription ID : 846901e6-da09-45c8-98ca-7cca2353ff0e

Tags (edit) : Add tags

Name : myNewSSHkey1974

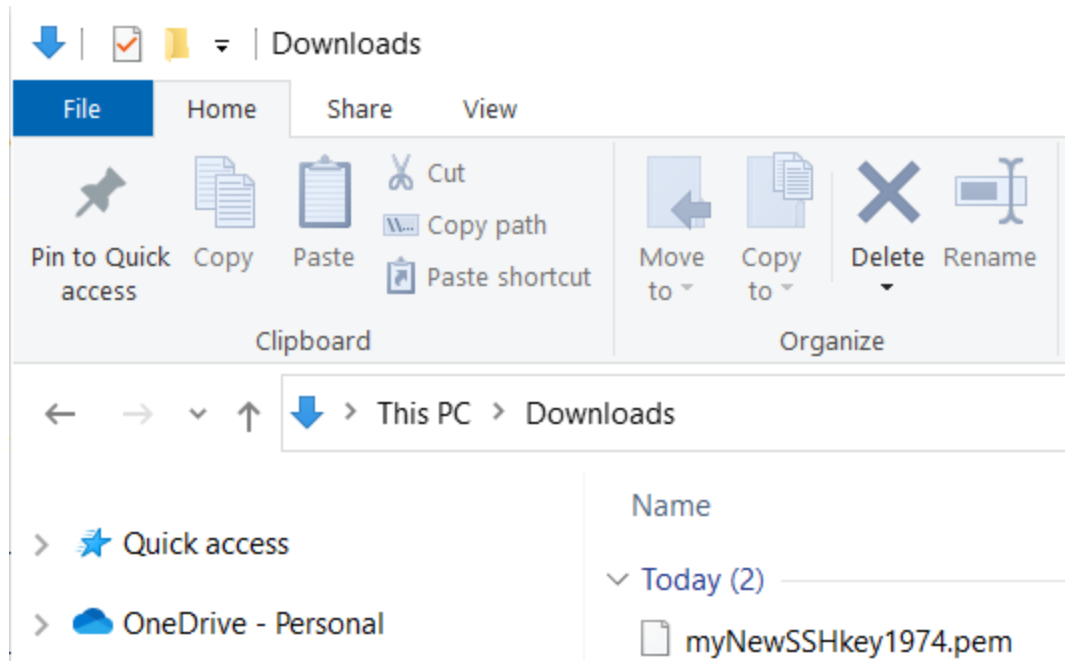
Public key : ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQCAZC4PU0GXLZY2P9D6qHF+vv1IVokfr89oosEiK5eoG2o/yzU76kLBpy8oITQCOuq0cKZlj6tNHsPJZhSuWqb+nRzQgJ4G5Mc1Qwb1d67hdKUYPXWrp0llzm6MPqghGxusgZwaqHjHPz0bSA56UkJTH3YIm/iPC91OBL7x5MrG/n/fUNRIhk+aUYXltM/xqVdKqHs2YUygh1PLs7Mho8WtVGklGTIqIaDpoUMNjCPXX4IIQSV8pP8HijQhtf0HSAXSYyW422xPoMSMxGmVv11M7QajUL/yHN3I3iWopFqfevYCSEH3WnwyrExb9ziTalHy8g3HqgL/yiFTSfTkaqZE9T80vhC9s1aRYiFnMbZN7Tcg0in4OcYH0o/CpAlp3sg6hy1mLLjFmz8jKklnlvhKg03lUsM+byASZY6cC22IGcM7jkEpC9R/gxQ5S2SQwuKI4i/tWQIXlLd7wAdWPSDfF/vrvV/YhAxGp6BTSksRbkzOfCUM4/4+HDLXiR/0= generated-by-azure

JSON View

Public key

ssh-rsa  
AAAAB3NzaC1yc2EAAAADAQABAAQCAZC4PU0GXLZY2P9D6qHF+vv1IVokfr89oosEiK5eoG2o/yzU76kLBpy8oITQCOuq0cKZlj6tNHsPJZhSuWqb+nRzQgJ4G5Mc1Qwb1d67hdKUYPXWrp0llzm6MPqghGxusgZwaqHjHPz0bSA56UkJTH3YIm/iPC91OBL7x5MrG/n/fUNRIhk+aUYXltM/xqVdKqHs2YUygh1PLs7Mho8WtVGklGTIqIaDpoUMNjCPXX4IIQSV8pP8HijQhtf0HSAXSYyW422xPoMSMxGmVv11M7QajUL/yHN3I3iWopFqfevYCSEH3WnwyrExb9ziTalHy8g3HqgL/yiFTSfTkaqZE9T80vhC9s1aRYiFnMbZN7Tcg0in4OcYH0o/CpAlp3sg6hy1mLLjFmz8jKklnlvhKg03lUsM+byASZY6cC22IGcM7jkEpC9R/gxQ5S2SQwuKI4i/tWQIXlLd7wAdWPSDfF/vrvV/YhAxGp6BTSksRbkzOfCUM4/4+HDLXiR/0= generated-by-azure

The PRIVATE key \*.pem file is downloaded



## 5. Copy the PUBLIC key in the C# source code

---

Microsoft Azure

Search resources, services, and docs (G+)

Home > SSH keys >

## SSH keys

particular (luiscocoenriquez@hotmail.onmicrosoft.c...

+ Create Manage view

Filter for any field...

Name ↑

- mynewsshkey

### mynewsshkey

SSH key

Search

Delete Refresh

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

### Settings

Properties

Locks

### Automation

Tasks (preview)

Export template

### Help

Support + Troubleshooting

### Essentials

JSON View

Resource group ([move](#))  
[mysshkeyRG](#)

Location  
West Europe

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

Subscription ID  
846901e6-da09-45c8-98ca-7cca2353ff0e

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

Name  
mynewsshkey

Public key  
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQgQC62swVPqUSWDldLCH/UelaV5hBQ7K2UjumZcVO+B4qjL3mCgN2oBtXXEXVI+i3xVDCr7E/sW9g9wxWUUvaENTXLJTUPPwcmeJeGppxcTFFbf258LAKXV9Gh2fbaDw91DYmXbUlrRCiK7QMvSitEgjJmfrZd8p6a9bNWFpSNlgr7QbpFiTedsuk4iVX25IA7Tu41c85D6xBsVdy7+nMzLFbP+axb57JWKk7DboRESqb+1YVtrygBRqok30porTCRnblEu+Z3E5dDxwslCMvpiKcvjG8oAY/90rT4G7GBNSkVgfdZtl8/uekS1kJRGkGCo2Ymjj0x1STYVGeyriQurOeHgDKUuK1aaQAnde4z4x8fzwpd6TnTwpP/odEEPij6F11DCaJZfq70zrwqOmJJn+OCjdYvHzUda+ACeb4g6MAwefeBq3+rZgX78sWwzw5+akhichuPeDplltl3bN8GUEu3gdZTI3/eV6k6fLyW5IEOU= generated-by-azure

Public key

ssh-rsa  
AAAAAB3NzaC1yc2EAAAADAQABAAQgQC62swVPqUSWDldLCH/UelaV5hBQ7K2UjumZcVO+B4qjL3mCgN2oBtXXEXVI+i3xVDCr7E/sW9g9wxWUUvaENTXLJTUPPwcmeJeGppxcTFFbf258LAKXV9Gh2fbaDw91DYmXbUlrRCiK7QMvSitEgjJmfrZd8p6a9bNWFpSNlgr7QbpFiTedsuk4iVX25IA7Tu41c85D6xBsVdy7+nMzLFbP+axb57JWKk7DboRESqb+1YVtrygBRqok30porTCRnblEu+Z3E5dDxwslCMvpiKcvjG8oAY/90rT4G7GBNSkVgfdZtl8/uekS1kJRGkGCo2Ymjj0x1STYVGeyriQurOeHgDKUuK1aaQAnde4z4x8fzwpd6TnTwpP/odEEPij6F11DCaJZfq70zrwqOmJJn+OCjdYvHzUda+ACeb4g6MAwefeBq3+rZgX78sWwzw5+akhichuPeDplltl3bN8GUEu3gdZTI3/eV6k6fLyW5IEOU= generated-by-azure

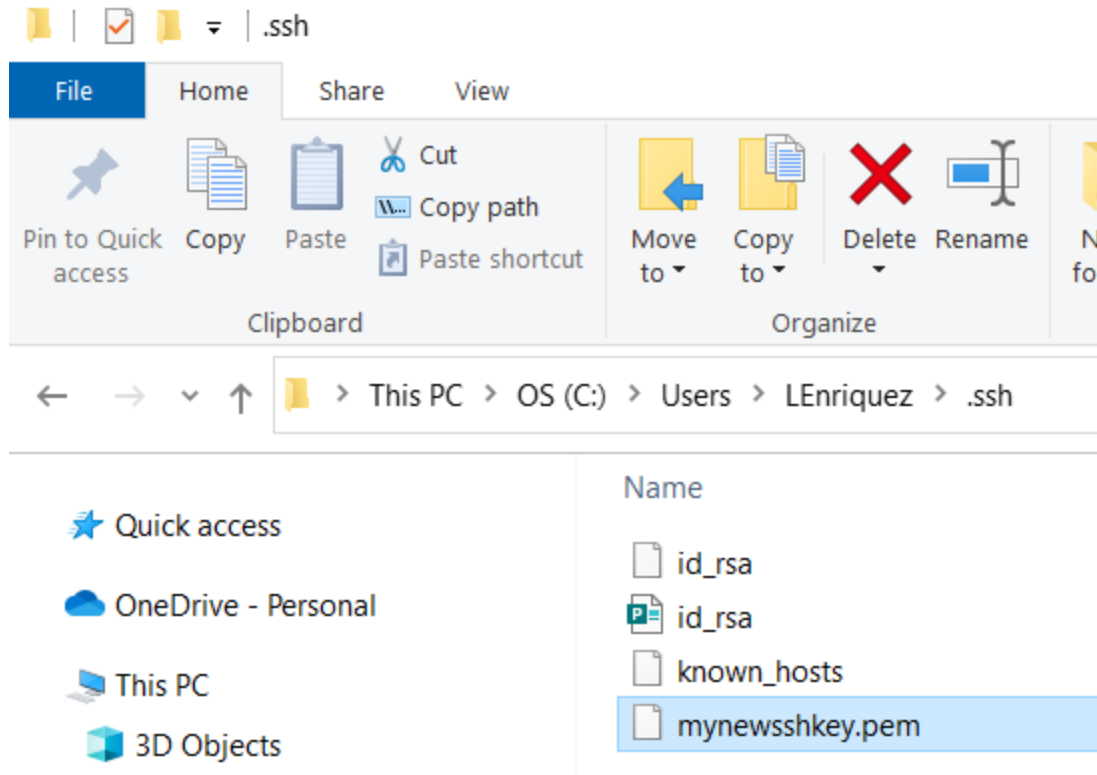
Copied

```
160         content: |\n" +  
161             [Resolve]\n" +  
162             DNS=8.8.8.8 8.8.4.4\n" +  
163             "runcmd:\n" +  
164             " - systemctl restart systemd-resolved\n"  
165     )),  
166     LinuxConfiguration = new LinuxConfiguration()  
167     {  
168         DisablePasswordAuthentication = true,  
169         SshPublicKeys = {  
170             new SshPublicKeyConfiguration()  
171             {  
172                 Path = $"/home/" + adminusername + "/.ssh/authorized_keys",  
173                 KeyData = "ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQGC62swVPqUSWD1dLCH/Ue1",  
174             }  
175         }  
176     },  
177 }
```

## 6. Download the PRIVATE key \*.pem file

Copy the private key file (\*.pem) and paste it in: "C:\Users\LEnriquez.ssh"





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

Home > Resource groups > myRgName > myVM

**myVM | Connect** Virtual machine

Search

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

**Connect**

Connect  
Bastion

**Networking**

Network settings  
Load balancing  
Application security groups  
Network manager

**Settings**

Disks  
Extensions + applications

Refresh Troubleshooting More Options Feedback

Connecting using  
Public IP address | 13.95.138.186

Admin username : azureuser  
Port (change) : 22 [Check access](#)  
Just-in-time policy : Not configured for port 22 [Configure for this port](#)

**Recommended**

SSH using Azure CLI  
Quickly connect in browser. Supports Azure AD authentication. Private key not required.  
Public IP address (13.95.138.186)  
[Select](#)

**Most common**

Native SSH  
No additional software needed. Private key connection. Best for those with existing SSH keys.  
Public IP address (13.95.138.186)  
[Select](#)

More ways to connect (3)

**Native SSH**  
Connect from your local machine (Windows)

Switch local machine OS

- Configure prerequisites for Native SSH**  
Azure needs to configure some features in order to connect to the VM.
  - Configuring prerequisites**
    - Port 22 access**  
Configuring Just In Time on the virtual machine. [Learn more](#)  
Change the port for connecting to this virtual machine on the Connect page of the virtual machine.
    - Public IP address: 13.95.138.186**  
A public IP address is required to connect via this connection method.
  - ☒ I understand just-in-time policy on the virtual machine may be re-configured to allow local machine IP (81.33.224.176) to request just-in-time access to port 22.
- Open a local shell (on Windows)**  
Open Terminal (Windows 11), PowerShell (Windows 10 or less), or a shell of your choice. Or switch the local machine OS above to view more instructions.
- Copy and execute SSH command**  
Provide a path to your SSH private key file on your local machine.  
`C:/Users/LEnriquez/.ssh/mynewsshkey.pem`  
Can't find your private key? [Reset your SSH private key](#)

[Close](#) [Troubleshooting](#) [Give feedback](#)

## 7. Build and run the application

Execute the command:

```
dotnet run
```

## 8. Access to the Virtual Machine

Microsoft Azure

Search resources, services, and docs (G+/)

Home > Virtual machines >

## Virtual machines

particular (luiscocoenriquezhotmail.onmicrosoft.c...

+ Create ▾ Switch to classic ...

Filter for any field...

Name ↑↓

myVM ...

### myVM

Virtual machine

Search

Connect ▾

Start Restart Stop Hibernate (preview) Capture Delete Refresh ...

Connect

Connect via Bastion

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

#### Connect

Connect

Bastion

#### Networking

Network settings

Load balancing

Application security groups

Machine agent status is not ready. Troubleshoot the issue →

#### Essentials

Resource group (move)  
[myRgName](#)

Status  
Running

Location  
West Europe

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

Subscription ID  
846901e6-da09-45c8-98ca-7cca2353ff0e

Tags (edit)  
[Add tags](#)

Operating system  
Linux

Size  
Standard E2s v3 (2 vcpus, 16 GiB memory)

Public IP address  
[13.95.138.186](#)

Virtual network/subnet  
[myVnet/mySubnet](#)

DNS name  
[mydomain12319741999.westeurope.cloudapp.azure.com](#)

Health state  
-

JSON View

Microsoft Azure

Search resources, services, and docs (G+)

Home > Virtual machines > myVM

## Virtual machines

particular (luiscocoenriquezhotmail.onmicrosoft.c...

+ Create ▾ Switch to classic ...

Filter for any field...

Name ↑↓

- myVM

Page 1 of 1

### myVM | Connect

Virtual machine

Search

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

#### Connect

- Connect
- Bastion

#### Networking

- Network settings
- Load balancing
- Application security groups
- Network manager

#### Settings

- Disks
- Extensions + applications

Refresh Troubleshooting ▾ More Options ▾ Feedback

Connecting using  
Public IP address | 13.95.138.186

Admin username  
azureuser

Port (change)  
22 **Check access** ⓘ

Just-in-time policy (configure)  
Configured for port 22 [Request access](#)

#### Recommended

SSH using Azure CLI

Quickly connect in browser. Supports Azure AD authentication. Private key not required.

Public IP address (13.95.138.186)

Select

#### Most common

Native SSH

No additional software needed. Private key required for connection. Best for those with existing SSH tools.

Public IP address (13.95.138.186)

Select

The screenshot shows the Microsoft Azure portal interface. The main content area displays the 'myVM' virtual machine page, which includes a search bar, a list of tabs (Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems), and a 'Connect' section. The 'Connect' section shows the public IP address (13.95.138.186) and the port (22). A 'Native SSH' sidebar is open on the right, showing the 'Prerequisites configured' status and the 'Port 22 access' configuration. The sidebar also shows the 'Public IP address: 13.95.138.186' and the 'Just-in-time policy' status. A red box highlights the 'Configured' status of the just-in-time policy. Another red box highlights the SSH command to be executed: `ssh -i C:/Users/LEnriquez/.ssh/mynewsshkey.pem azureuser@13.95.13...`.

## 9. Access with bastion

Microsoft Azure

Search resources, services, and docs (G+/)

Home > Virtual machines > myVM

## Virtual machines

particular (luiscocoenriquezhotmail.onmicrosoft.c...

+ Create ▾ Switch to classic ...

Filter for any field...

Name ↑↓

myVM

### myVM | Bastion

Virtual machine

Search

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

Connect

- Connect
- Bastion**

Networking

- Network settings

Azure Bastion protects your virtual machines by providing lightweight, browser-based connectivity without the need to expose them through public IP addresses. Deploying will automatically create a Bastion host on a subnet in your virtual network. [Learn more](#)

#### Create Bastion

Name	myVnet-bastion
Resource group	myRgName
Virtual network	myVnet
Public IP address	myVnet-ip

Bastion pricing starts with an hourly base rate. [Learn more](#)

**Deploy Bastion** Configure manually

The screenshot shows the Microsoft Azure portal interface. At the top, there's a search bar and a navigation menu. The main content area displays the configuration for a Bastion host named 'myVM Bastion'. The left sidebar contains a navigation pane with options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Connect, and Networking. The 'Connect' section is expanded, showing options for Authentication Type (SSH Private Key from Local File), Username (azureuser), and Local File (Select a file). The provisioning state is 'Succeeded'. There is a 'Connect' button at the bottom left of the configuration area.

Microsoft Azure

Search resources, services, and docs (G+)

Home > myVM

**myVM | Bastion** ☆ ...  
Virtual machine

Search

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

**Connect**

Connect  
Bastion

**Networking**

Network settings  
Load balancing  
Application security groups  
Network manager

Azure Bastion protects your virtual machines by providing lightweight, browser-based connectivity without the need to expose them through public IP addresses. Deploying will automatically create a Bastion host on a subnet in your virtual network. [Learn more](#)

Using Bastion: **myVnet-bastion**

Provisioning State: **Succeeded**

Please enter username and password to your virtual machine to connect using Bastion.

Authentication Type ⓘ SSH Private Key from Local File

Username ⓘ azureuser ✓

Local File ⓘ Select a file

Advanced

Open in new browser tab

**Connect**

Then we upload the private key file

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes the 'Microsoft Azure' logo, a search bar, and icons for navigation, help, and settings. The left sidebar contains a navigation menu with options like 'Home', 'myVM', 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', 'Diagnose and solve problems', 'Connect', and 'Networking'. The main content area displays the 'myVM | Bastion' page, which includes a search bar, a description of Azure Bastion, and a 'Connect' button. A file explorer window is open, showing the 'Enriquez, Luis' directory. The file explorer lists several files, including 'id\_rsa', 'id\_rsa', 'known\_hosts', and 'myNewSSHkey1974.pem'. The 'myNewSSHkey1974.pem' file is selected, and the 'File name' field at the bottom shows 'myNewSSHkey1974.pem'.

Microsoft Azure

Search resources, services, and docs (G+/)

Home > myVM

myVM | Bastion

Virtual machine

Search

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Connect

Connect

Bastion

Networking

Network settings

Load balancing

Application security groups

Network manager

Azure Bastion protects your virtual machines by providing lightweight, browser-based connectivity without the need to expose them through public IP addresses. Deploying will automatically create a Bastion host on a subnet in your virtual network. [Learn more](#)

Using Bastion: **myVnet-bastion**

Provisioning State: **Succeeded**

Please enter username and password

Authentication Type ⓘ

Username ⓘ

Local File ⓘ

Advanced

Connect

Open

< > > Enriquez, Luis > .ssh

Search .ssh

Organize New folder

Name	Date modified	Type
This PC		
3D Objects		
Desktop		
Documents		
Downloads		
Music		
Pictures		
id_rsa	11/8/2022 6:56 PM	File
id_rsa	11/8/2022 6:56 PM	Microsoft Pu
known_hosts	12/1/2023 6:51 PM	File
myNewSSHkey1974.pem	12/1/2023 6:56 PM	PEM File

File name: myNewSSHkey1974.pem

All Files

Open Cancel



The screenshot shows the Microsoft Azure portal interface. At the top, there's a search bar and the Microsoft Azure logo. The left sidebar contains navigation icons for Home, Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Connect, Networking, and Application security groups. The main content area is titled 'myVM | Bastion' and shows the provisioning state as 'Succeeded'. It includes a 'Connect' button and a checkbox for 'Open in new browser tab'.

Home > myVM

myVM | Bastion  
Virtual machine

Search

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Connect

Connect

Bastion

Networking

Network settings

Load balancing

Application security groups

Azure Bastion protects your virtual machines by providing lightweight, browser-based connectivity without the need to expose them through public IP addresses. Deploying will automatically create a Bastion host on a subnet in your virtual network. [Learn more](#)

Using Bastion: **myVnet-bastion**

Provisioning State: **Succeeded**

Please enter username and password to your virtual machine to connect using Bastion.

Authentication Type ⓘ SSH Private Key from Local File

Username ⓘ azureuser

Local File ⓘ "myNewSSHkey1974.pem"

Advanced

Open in new browser tab

Connect

Then we press the "Connect" button. A new internet web browser window will be opened in a new tab with the Linux Virtual Machine connection.

## 10. Just-in-time policy required Microsoft Defender

Microsoft Azure

Search resources, services, and docs (G+/)

Home > Virtual machines > myVM

## Virtual machines

particular (luiscoenriquezhotmail.onmicrosoft.C...

+ Create ▾ Switch to classic ...

Filter for any field...

Name ↑↓

myVM

myVM | Connect

Virtual machine

Search

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Connect

Connect

Bastion

Networking

Network settings

Load balancing

Application security groups

Network manager

Settings

Disks

Extensions + applications

Refresh Troubleshooting ▾ More Options ▾ Feedback

Connecting using

Public IP address | 13.95.138.186

Admin username  
azureuser

Port (change)  
22 [Check access](#) ⓘ

**Just-in-time policy (configure)**

Configured for port 22 [Request access](#)

### Recommended

Local machine Azure portal

#### SSH using Azure CLI

Quickly connect in browser. Supports Azure AD authentication. Private key not required.

Public IP address (13.95.138.186)

Select

### Most common

Local machine

#### Native SSH

No additional software needed. Private key required for connection. Best for those with existing SSH tools.

Public IP address (13.95.138.186)

Select

< Page 1 of 1 >

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

Home > Virtual machines > myVM

## Virtual machines

particular

+ Create ▾ Switch to classic ...

Filter for any field...

Name ↑↓

- myVM

### myVM | Connect

Virtual machine

Search

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

Connect

- Connect

Refresh Troubleshooting ▾ More Options ▾ Feedback

Connecting using  
Public IP address | 13.95.138.186

Admin username  
azureuser

Port (change)  
22 Check access ⓘ

Just-in-time policy (configure)

Configured for port 22 Request access

Microsoft Azure

Search resources, services, and docs (G+)

Home > Virtual machines > myVM | Connect >

## Just-in-time VM access

Last week

### What is just-in-time VM access?

Just-in-time VM access enables you to lock down your VMs in the network level by blocking inbound traffic to specific ports. It enables you to control the access and reduce the attack surface to your VMs, by allowing access only upon a specific need.

[Learn more about just-in-time VM access >](#)

### How does it work?

Upon a user request, based on Azure RBAC, Defender for Cloud will decide whether to grant access. If a request is approved, Defender for Cloud automatically configures the NSGs to allow inbound traffic to these ports, for the requested amount of time, after which it restores the NSGs to their previous states.

[Learn more about how to use just-in-time VM access >](#)

## Virtual machines

**Configured** Not Configured Unsupported

VMs for which the just-in-time VM access control is already in place. Presented data is for the last week.

**1** VMs [Request access](#)

Search to filter items...

Virtual machine	Approved	Last access	Connection details	Last user
<input type="checkbox"/> myVM	1 Requests	Active now	Ports: 22	live.com#luiscocoenriquez@hotmail.com

Microsoft Azure

Search resources, services, and docs (G+)

Home > Virtual machines > myVM | Connect >

## Just-in-time VM access

Last week

- > What is just-in-time VM access?
- > How does it work?

### Virtual machines

Configured Not Configured Unsupported

VMs for which the just-in-time VM access control is already in place. Presented data is for the last week.

1 VMs

Search to filter items...

Virtual machine	Approved	Last access	Connection details	Last user
<input checked="" type="checkbox"/> myVM	3 Requests	Active now	Ports: 22	live.com#luiscocoenriquez@hotmail.com

Request access

After requesting the access with the Just-in-time policy we can use the Azure CLI for accessing the Linux VM.

Microsoft Azure

Search resources, services, and docs (G+)

Home > Virtual machines > myVM

## Virtual machines

particular

+ Create ▾ Switch to classic ...

Filter for any field...

Name ↑↓

- myVM

myVM | Connect

Virtual machine

Search

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

Connect

- Connect
- Bastion

Networking

- Network settings
- Load balancing
- Application security groups
- Network manager

Settings

- Disks
- Extensions + applications

### SSH using Azure CLI

Connect from your local machine (Windows)

Connect from the Azure portal Switch local machine OS ▾

- Configure prerequisites for SSH using Azure CLI**

Azure needs to configure some features in order to connect to the VM.

  - Ready for configuration**
    - System assigned managed identity**

Azure will configure a system-assigned managed identity in order to enable the Azure AD login extension. [Learn more](#)
    - Azure AD SSH Login Extension**

The Azure Active Directory based SSH Login extension will securely connect to the VM using Azure AD instead of SSH or a username and password. [Learn more](#)
    - Virtual machine user or administrator login**

A virtual machine administrator login role on the resource group will allow login to the virtual machine via CloudShell. [Learn more](#)
    - Port 22 access**

Just In Time on the virtual machine will temporarily configure a network security group rule for all incoming traffic from the local machine IP (81.33.224.176) to port 22. [Learn more](#)

Change the port for connecting to this virtual machine on the Connect page of the virtual machine.
    - Public IP address: 13.95.138.186**

A public IP address is required to connect via this connection method.

☐ understand just-in-time policy on the virtual machine may be re-configured to allow local machine IP (81.33.224.176) to request just-in-time access to port 22.

Close Troubleshooting Give feedback

SSH using Azure CLI

Quickly connect in browser. Supports Azure AD authentication. Private key not required.

Public IP address (13.95.138.186)

Select

Serial console

Troubleshooting with access independent of the network or operating system state.

Go to serial console

Microsoft Azure

Search resources, services, and docs (G+)

Home > Virtual machines > myVM

## Virtual machines

particular

+ Create ▾ Switch to classic ...

Filter for any field...

Name ↑↓

myVM

myVM | Connect

Virtual machine

Search

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Connect

Connect

Bastion

Networking

Network settings

Load balancing

Application security groups

Network manager

Settings

Disks

Extensions + applications

### SSH using Azure CLI

Connect from your local machine (Windows)

(81.33.224.176) to port 22. [Learn more](#)

Change the port for connecting to this virtual machine on the Connect page of the virtual machine.

Public IP address: **13.95.138.186**  
A public IP address is required to connect via this connection method.

☒ I understand just-in-time policy on the virtual machine may be re-configured to allow local machine IP (81.33.224.176) to request just-in-time access to port 22.

**Configure**

**2 Download Azure Command Line Interface (on Windows)**  
The Azure command-line interface (Azure CLI) is a set of commands used to create and manage Azure resources. Download it prior to connecting to your VM. [Learn more](#)

[Download Azure CLI for Windows](#)

**3 Open a local shell and login (on Windows)**  
Open Terminal (Windows 11), PowerShell (Windows 10 or less), or a shell of your choice. Or switch the local machine OS above to view more instructions. Copy and paste the command to sign in with Azure CLI.

`az login`

**4 Copy and execute AZ SSH command**  
Copy and execute the command in your local shell.

`az ssh vm --ip 13.95.138.186`

**Select**

**Serial console**  
Troubleshooting with access independent of the network or operating system state.

**Go to serial console**

**Close** Troubleshooting [Give feedback](#)

We can connect to the Linux VM with these commands:

```
az ssh vm --ip 13.95.138.186
```

or

```
az ssh vm --resource-group myRgName --name myVM --subscription 846901e6-da09-45c8-98ca-7cca2353ff0e
```

## 11. Acces from Linux Virtual Machine to Internet

Be sure your Linux Virtual Machine has access to internet. To do so run the following commands:

```
ping 8.8.8.8
```

Also try to run this command:

```
nslookup google.com
```

If you cannot connect to internet then run the command:

```
sudo nano /etc/systemd/resolved.conf
```

Then uncomment the line:

```
[Resolve]
DNS=8.8.8.8 8.8.4.4
```

The file will be like this:

```
# This file is part of systemd.
#
# systemd is free software; you can redistribute it and/or modify it under the
# terms of the GNU Lesser General Public License as published by the Free
# Software Foundation; either version 2.1 of the License, or (at your option)
# any later version.
#
# Entries in this file show the compile time defaults. Local configuration
# should be created by either modifying this file, or by creating "drop-ins" in
# the resolved.conf.d/ subdirectory. The latter is generally recommended.
# Defaults can be restored by simply deleting this file and all drop-ins.
```



```
#  
# Use 'systemd-analyze cat-config systemd/resolved.conf' to display the full config.  
#  
# See resolved.conf(5) for details.  
  
[Resolve]  
# Some examples of DNS servers which may be used for DNS= and FallbackDNS=:  
# Cloudflare: 1.1.1.1#cloudflare-dns.com 1.0.0.1#cloudflare-dns.com 2606:4700:4700::1111#cloudflare-dns.com 2606:4700:4># Google:  
# Quad9:      9.9.9.9#dns.quad9.net 149.112.112.112#dns.quad9.net 2620:fe::fe#dns.quad9.net 2620:fe::9#dns.quad9.net  
DNS=8.8.8.8 8.8.4.4  
#FallbackDNS=  
#Domains=  
#DNSSEC=no  
#DNSOverTLS=no
```

Then press **Ctrl + o** for saving the file, and then press **Enter** and finally press **Ctrl + x** to exit the nano editor

Then type the command:

```
sudo systemctl restart systemd-resolved
```

Then try again to connect with the command:

```
nslookup google.com
```

You should get this output:

```
azureuser@myVM:~$ nslookup google.com  
Server:      127.0.0.53  
Address:     127.0.0.53#53  
  
Non-authoritative answer:  
Name:   google.com
```

Address: 142.251.36.14

Name: google.com

Address: 2a00:1450:400e:811::200e

## 12. How to install in the Ubuntu Server the GUI Desktop, VSCode, Google Chrome and .NET 8

---

### 12.1. Run these commands to stall "xfce" using "apt":

```
sudo apt-get update
sudo DEBIAN_FRONTEND=noninteractive apt-get -y install xfce4
sudo apt install xfce4-session
```

### 12.2. Install and configure a remote desktop server:

```
sudo apt-get -y install xrdp
sudo systemctl enable xrdp
sudo adduser xrdp ssl-cert
echo xfce4-session > ~/.xsession
sudo service xrdp restart
```

### 12.3. Set a local user account password, for example:"Thismypassword123456"

```
sudo passwd azureuser
```

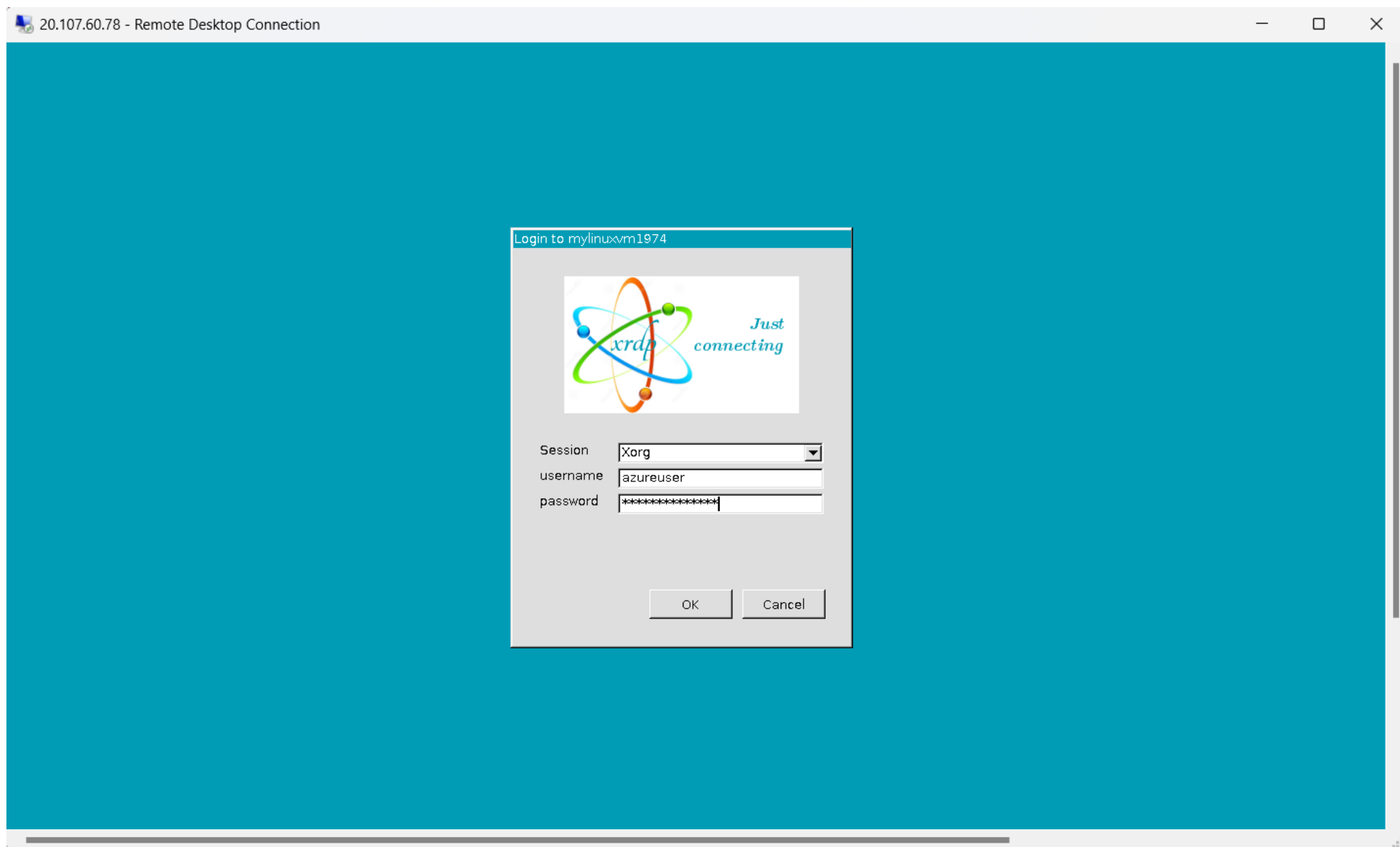
### 12.4. OPEN REMOTE DESKTOP CONNECTION

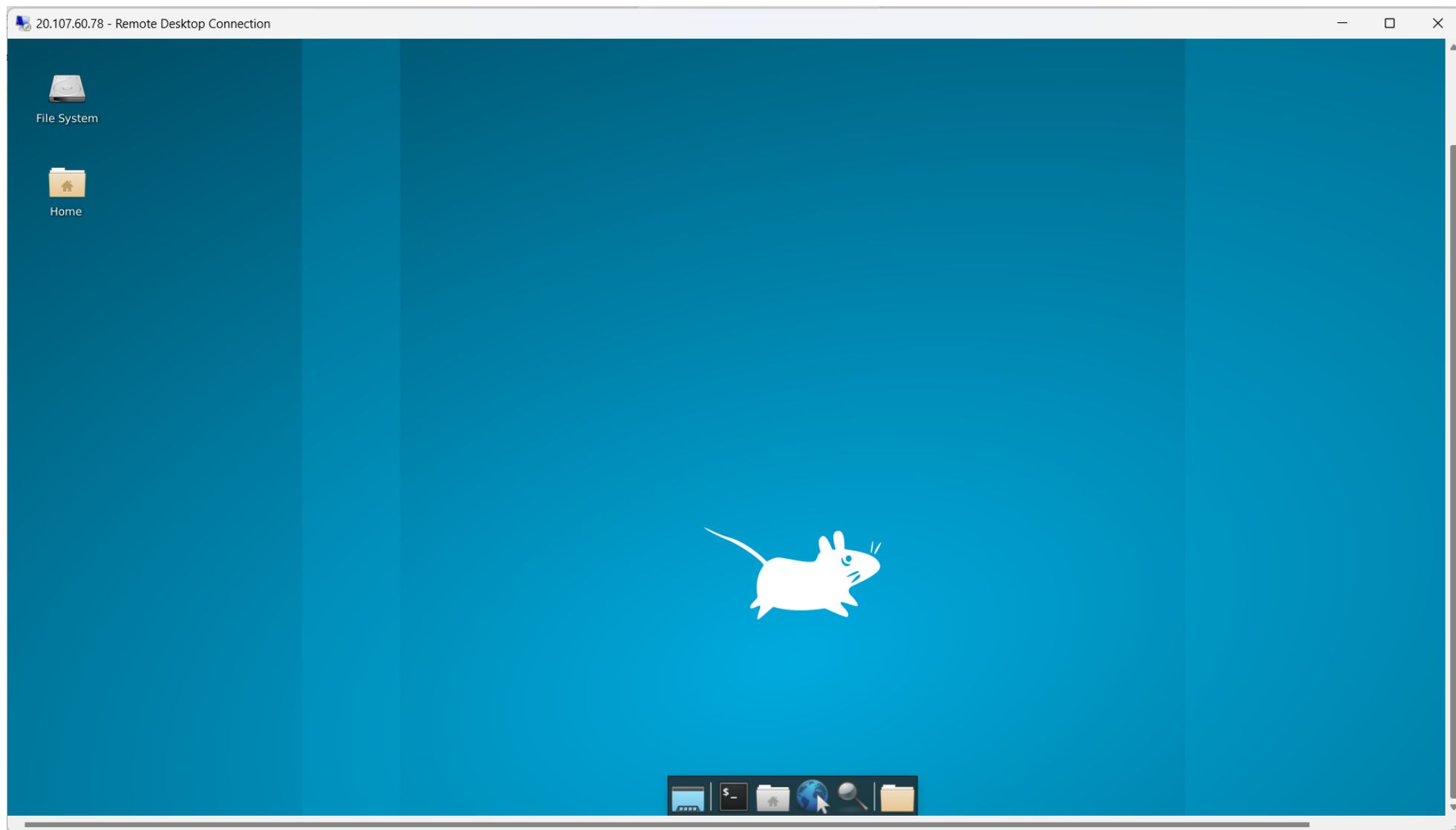
Now Open "Remote Desktop Connection" application and type the Azure VM Public IP address and the username "azureuser" and then press connect:

The screenshot shows the Microsoft Azure portal interface. In the background, the details for a virtual machine named 'mylinuxvm1974' are visible. The 'Essentials' section shows the VM is running in the West Europe region. The 'Properties' section lists details such as the computer name 'mylinuxvm1974', operating system 'Linux', and public IP address '20.107.60.78'. The 'Networking' section shows the VM is connected to the 'mylinuxvm1974-vnet/default' subnet.

In the foreground, the 'Remote Desktop Connection' window is open. The 'General' tab is selected. Under 'Logon settings', the 'Computer' field is set to '20.107.60.78' and the 'User name' field is set to 'azureuser'. The 'Connection settings' section has the 'Save' button highlighted.

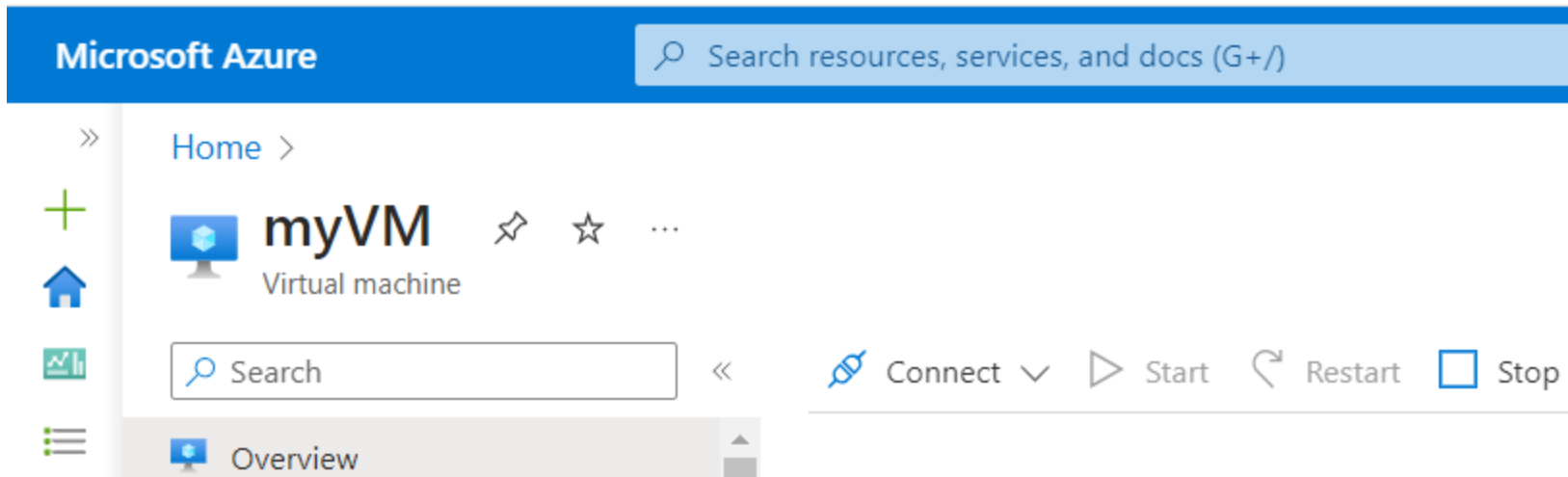
Then enter the password "Thismypassword123456" to access the Linux GUI Desktop, it also requires another password, set the same one as before "Thismypassword123456":





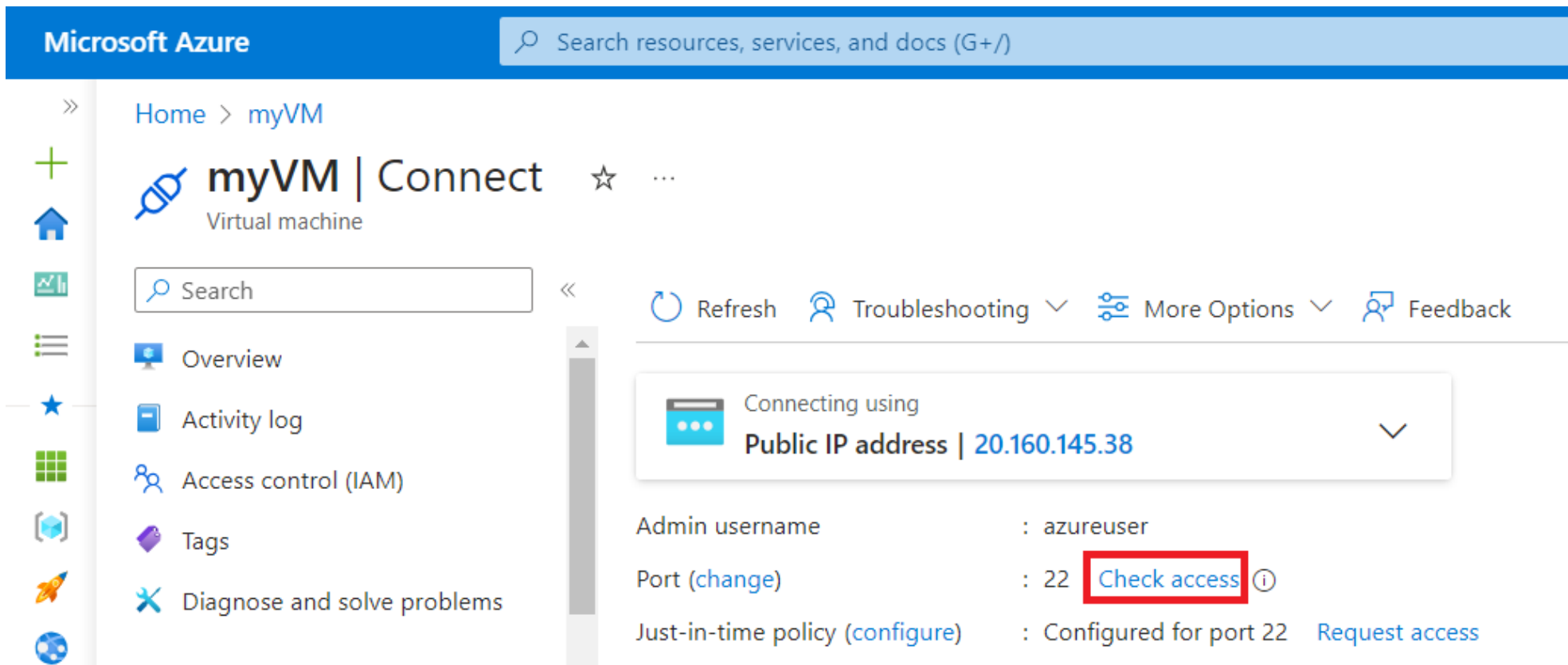
**IMPORTANT NOTE:** if you cannot access:

Restart the VM



The screenshot shows the Microsoft Azure portal interface. At the top is a blue header with the 'Microsoft Azure' logo and a search bar. Below the header, the breadcrumb 'Home >' is visible. The main content area displays the 'myVM' virtual machine. On the left, there is a sidebar with navigation icons and a list of options: Overview (selected), Activity log, Access control (IAM), Tags, and Diagnose and solve problems. The 'myVM' card shows a search bar and a set of action buttons: Connect (with a dropdown arrow), Start, Restart, and Stop. The 'Overview' tab is currently selected.

And Check the access,



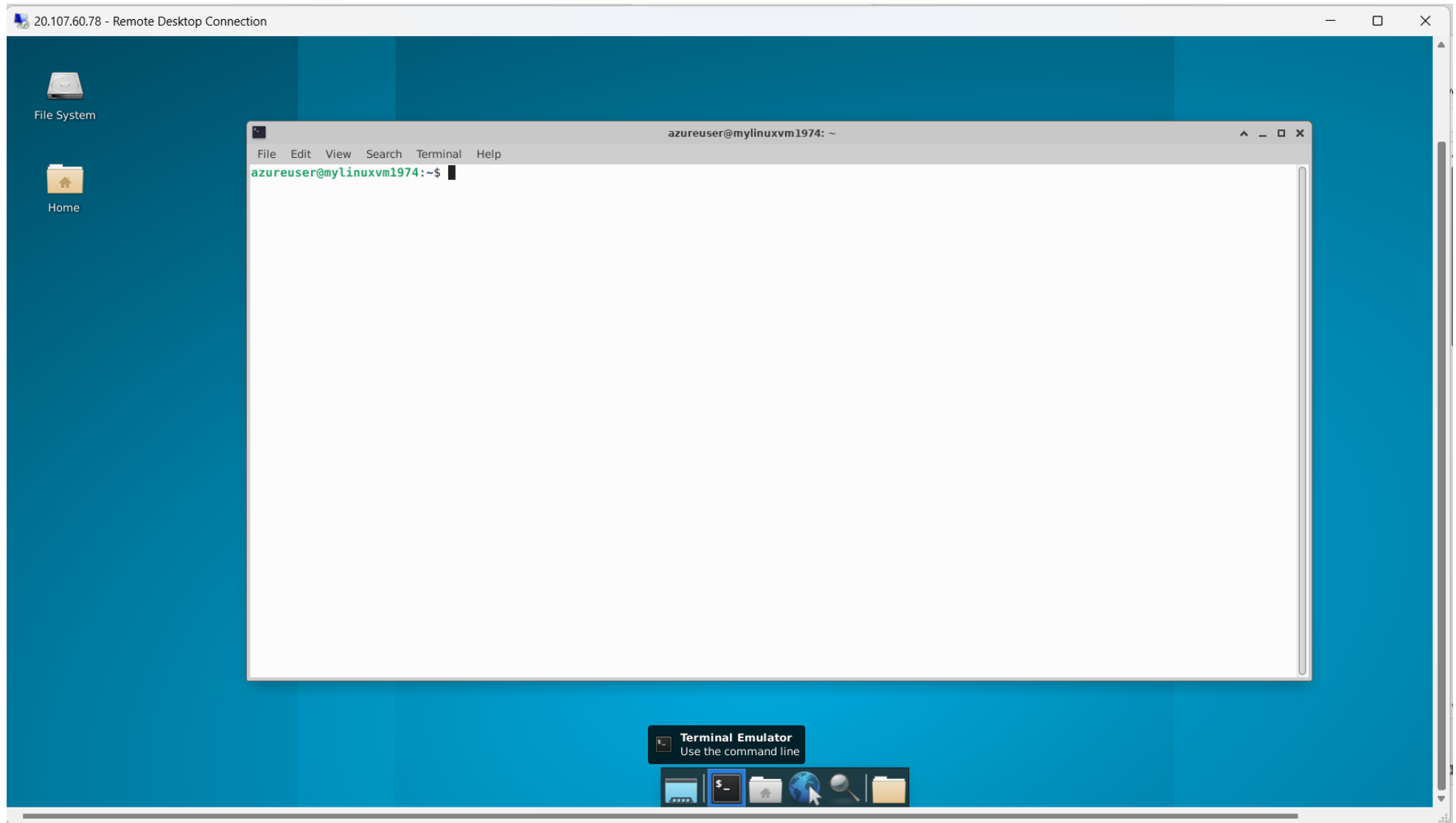
This screenshot shows the 'Connect' page for the 'myVM' virtual machine in the Azure portal. The breadcrumb is 'Home > myVM'. The page title is 'myVM | Connect'. The left sidebar is the same as in the previous screenshot. The main content area has a search bar and a row of action buttons: Refresh, Troubleshooting (with a dropdown arrow), More Options (with a dropdown arrow), and Feedback. Below these buttons, a box indicates the connection method: 'Connecting using Public IP address | 20.160.145.38'. Underneath, there is a table of connection details:

Admin username	:	azureuser
Port (change)	:	22 <a href="#">Check access</a> ⓘ
Just-in-time policy (configure)	:	Configured for port 22 <a href="#">Request access</a>

After try/run again the **Remote Desktop Connection**" application.

## 12.5. HOW TO INSTALL VSCODE

Open a Terminal Emulator window and run the following commands to install the VSCode application



```
sudo apt install software-properties-common apt-transport-https wget  
wget -q https://packages.microsoft.com/keys/microsoft.asc -O- | sudo apt-key add -  
sudo add-apt-repository "deb [arch=amd64] https://packages.microsoft.com/repos/vscode stable main"  
sudo apt update  
sudo apt install code
```

For accessing VSCode type the command:

code

## 12.6. HOW TO INSTALL GOOGLE CHROME

```
wget https://dl.google.com/linux/direct/google-chrome-stable_current_amd64.deb  
sudo dpkg -i google-chrome-stable_current_amd64.deb
```

## 12.7. HOW TO INSTALL .NET 8 SDK

```
wget https://packages.microsoft.com/config/ubuntu/20.04/packages-microsoft-prod.deb -O packages-microsoft-prod.deb  
sudo dpkg -i packages-microsoft-prod.deb
```

```
sudo apt update  
sudo apt install -y apt-transport-https  
sudo apt update  
sudo apt install -y dotnet-sdk-8.0
```

```
dotnet --version
```