

CELEBAL TECHNOLOGIES



Celebal Summer Internship

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Cloud Infrastructure & Security

Project - Report

Prepared by

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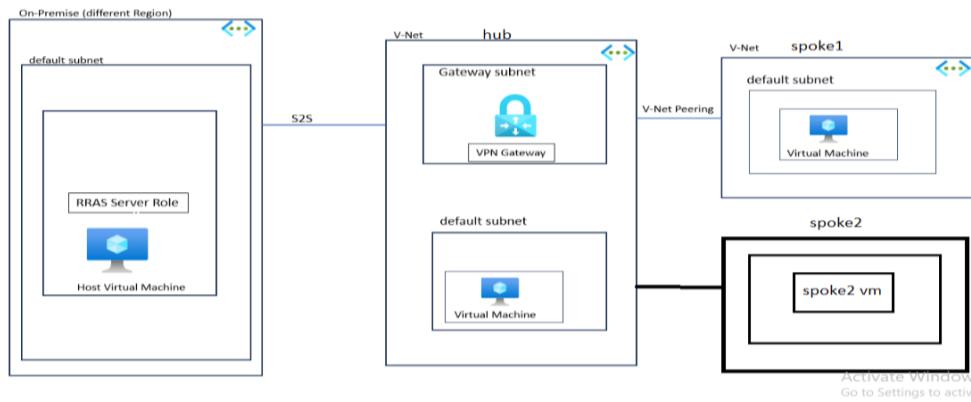
Batch -3rd June

Project Statement : Configuration of On-premises to Hub and Spoke connectivity using S2S tunneling from On-premises and hub and Transit Vnet peering from hub to spoke. Configure RRAS on on-premises VM and establish S2S connectivity to the Hub. The On-premise VM should be able to ping both Hub VM and Spoke VM successfully. The connectivity should be bi-directional. There is no direct connectivity established between spoke and On-premises Vnet.

Objective:

The objective of this project is to establish a secure and resilient network connectivity between an On-Premises environment and an Azure Virtual Network (VNet) architecture following a Hub and Spoke model. This connectivity will be achieved using Site-to-Site (S2S) VPN tunneling from the On-Premises network to the Azure Hub VNet and then utilizing Transit VNet peering to connect the Hub VNet to the Spoke VNets. The On-Premises Virtual Machine (VM) will be configured with the Routing and Remote Access Service (RRAS) to facilitate the S2S tunneling.

Architecture Of Project:



Implementation Of Project

Steps :

1. Create two resource groups in two different regions.

The screenshot shows the Microsoft Azure Resource Groups page. It displays three resource groups:

Name	Subscription	Location
NetworkWatcherRG	Azure for Students	Central India
VaishRG1	Azure for Students	East US
VaishRG2	Azure for Students	Central India

Below the table, there are buttons for "Create", "Manage view", "Refresh", "Export to CSV", "Open query", and "Assign tags". The page also includes filters for "Subscription equals all" and "Location equals all". At the bottom, there are links for "Activate Windows", "Give feedback", and navigation buttons for "Previous", "Page 1 of 1", and "Next >".

2. Create on-premise virtual network and Hub virtual network in same resource group i.e., VaishRG1.

The screenshot shows the Microsoft Azure portal interface. The user is viewing the 'Virtual networks' section. There are two entries listed:

Name	Resource group	Location	Subscription
VN-HUB	VaishRG1	East US	Azure for Students
VN-OnPremiseVaish	VaishRG1	East US	Azure for Students

At the bottom of the table, there are navigation buttons: < Previous, Page 1 of 1, and Next >. The status bar at the bottom right shows the date as 24-07-2023.

3. Add gateway subnets in both the virtual network.

The screenshot shows the 'VN-HUB | Subnets' page within the Azure portal. The left sidebar lists options like Overview, Activity log, Access control (IAM), Tags, and Subnets. The Subnets section is selected. Two subnets are listed:

Name	IPv4	IPv6	Available IPs	Delegated to
default	10.1.0.0/24	-	251	-
GatewaySubnet	10.1.1.0/24	-	availability dependent	-

The status bar at the bottom right shows the date as 24-07-2023.

VN-OnPremiseVaish | Subnets

Name	IPv4	IPv6	Available IPs	Delegated to
default	10.0.0.0/24	-	250	-
GatewaySubnet	10.0.1.0/24	-	availability dependent ...	-

4. Create a host virtual machine in on-premise network.

Create a virtual machine

Project details

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

Subscription *

Resource group * [Create new](#)

Instance details

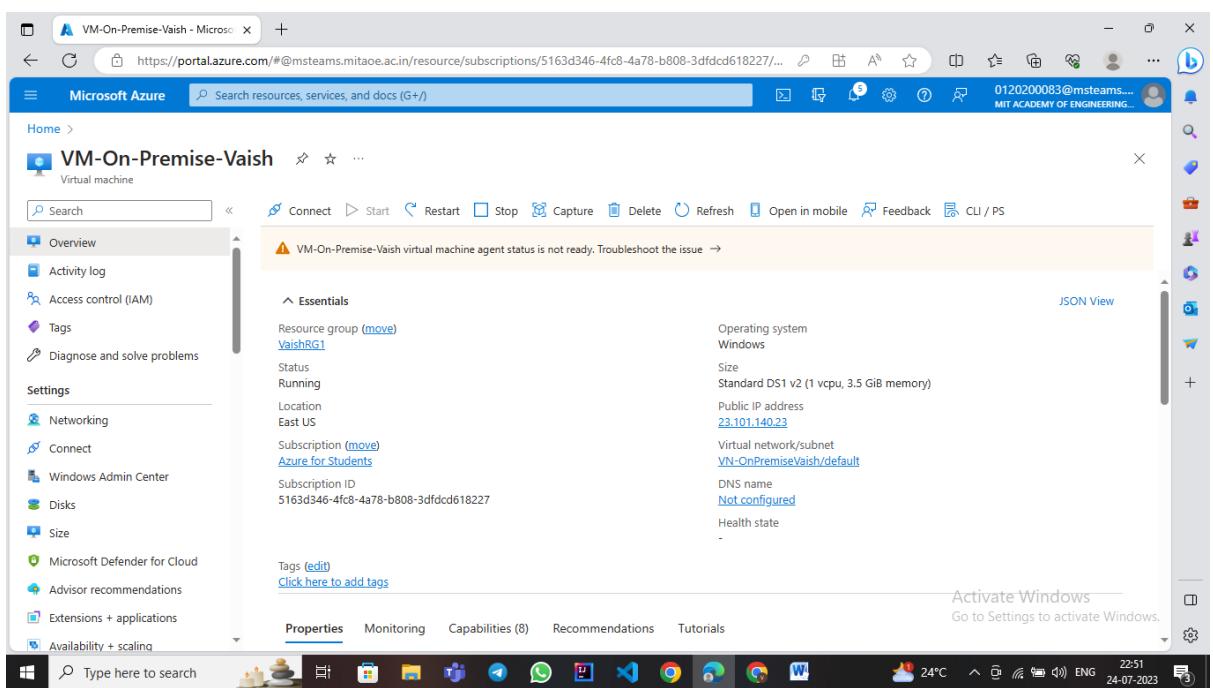
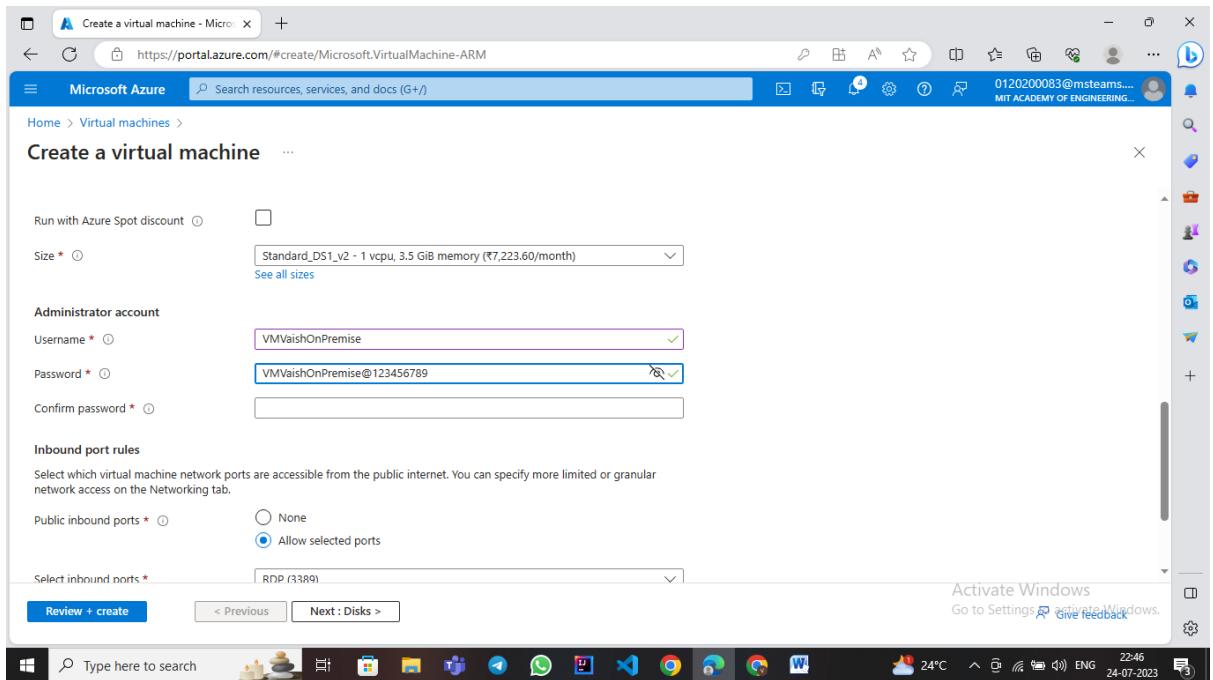
Virtual machine name *

Region *

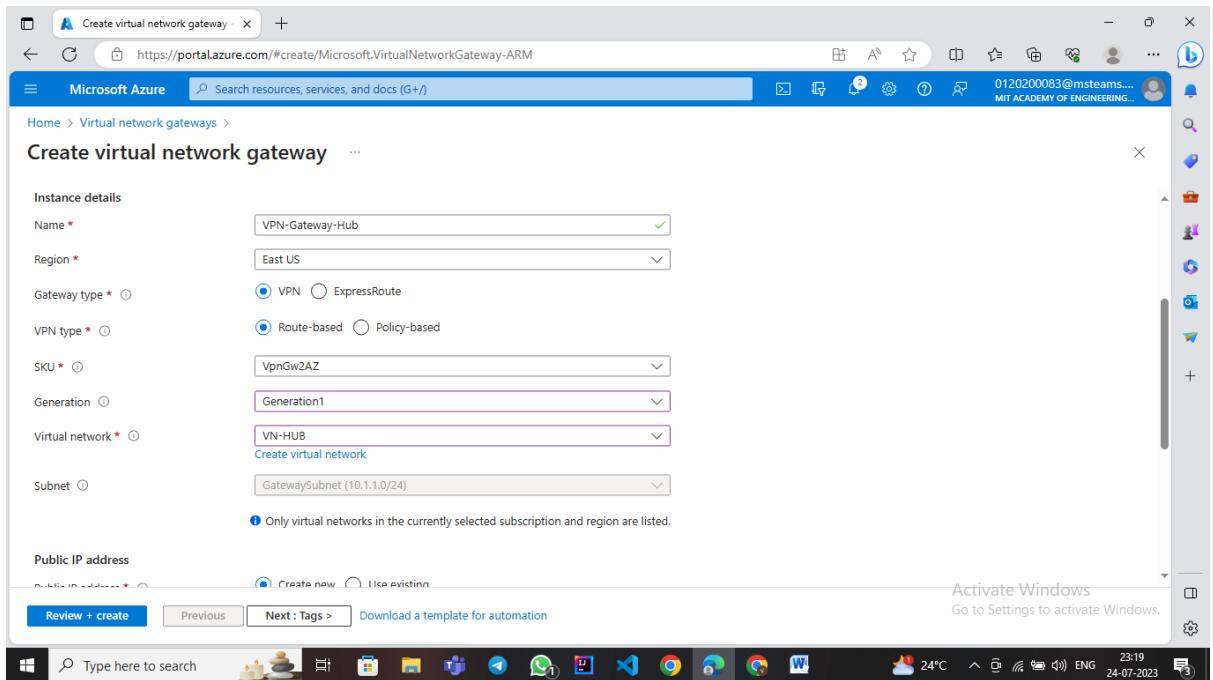
Availability options

Security type [Configure security features](#)

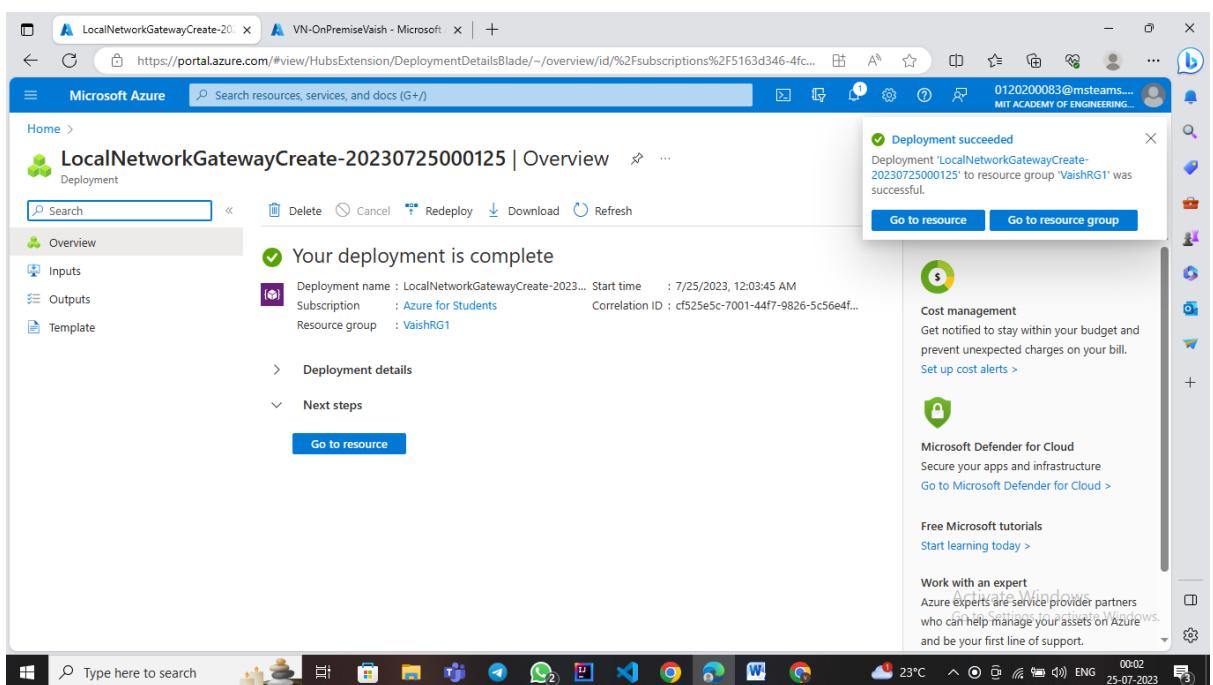
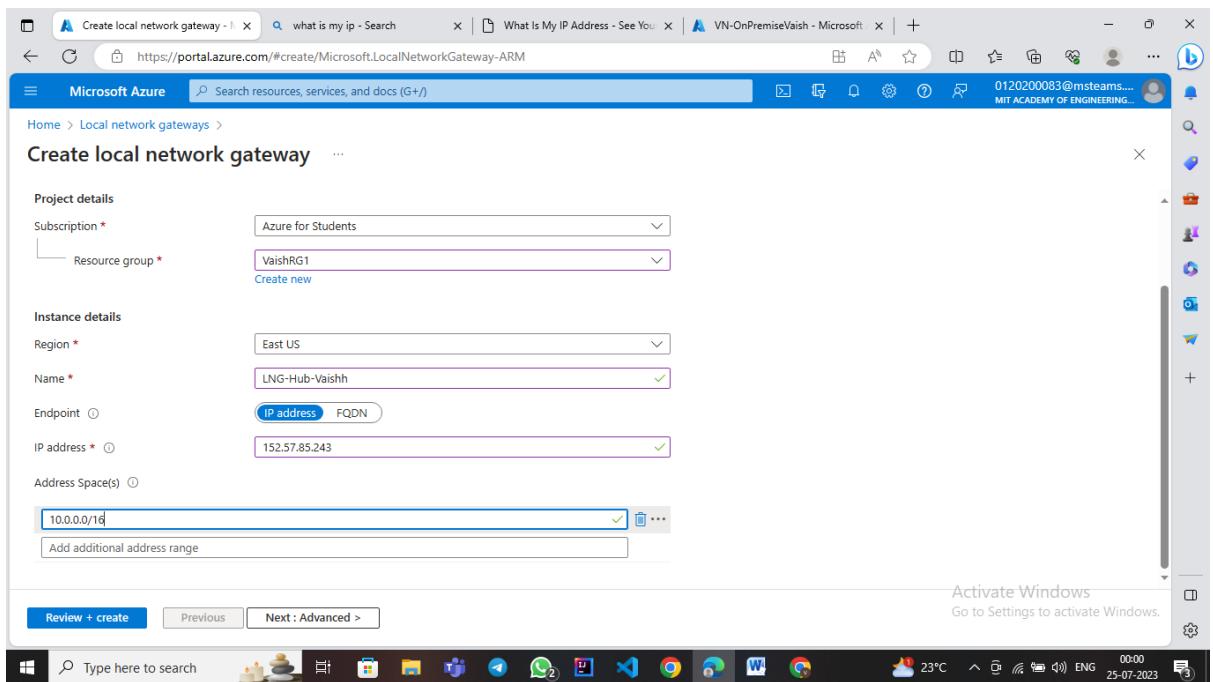
Image * [See all images](#) [Configure VM generation](#)



5. Now create a VPN-Gateway in Hub Network.



6. Create a local network gateway.



7. Create a S2S connection.

[Create connection - Microsoft A](#) [VN-OnPremiseVaish - Microsoft](#) +

https://portal.azure.com/#create/Microsoft.Connection-ARM

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

Home > Connections > Create connection ...

Basics Settings Tags Review + create

Create a secure connection to your virtual network by using VPN Gateway or ExpressRoute.
Learn more about VPN Gateway [View](#)
Learn more about ExpressRoute [View](#)

Project details

Subscription * Azure for Students
Resource group * VaishRG1 [Create new](#)

Instance details

Connection type * Site-to-site (IPsec)
Name * S2SConnection
Region * East US

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

Activate Windows Go to Settings to activate Windows.

Type here to search

Windows Start button Taskbar 23°C ENG 00:05 25-07-2023

[Create connection - Microsoft A](#) [VN-OnPremiseVaish - Microsoft](#) +

https://portal.azure.com/#create/Microsoft.Connection-ARM

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

Home > Connections > Create connection ...

Basics **Settings** Tags Review + create

Virtual network gateway
To use a virtual network with a connection, it must be associated to a virtual network gateway. [View](#)

Virtual network gateway * VPN-Gateway-Hub
Local network gateway * LNG-Hub-Vaishh
Shared key (PSK) * 12345 [Edit](#)

IKE Protocol IKEv1 IKEv2
Use Azure Private IP Address
Enable BGP
FastPath
IPSec / IKE policy Default Custom
Use policy based traffic selector Enable Disable

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

Activate Windows Go to Settings to activate Windows.

Type here to search

Windows Start button Taskbar 23°C ENG 00:06 25-07-2023

The screenshot shows the Microsoft Azure portal interface. The top navigation bar has tabs for 'S2SConnection - Microsoft Azure' and 'VN-OnPremiseVaish - Microsoft'. The main content area is titled 'S2SConnection' under 'Connections'. On the left, there's a sidebar with sections like 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', 'Settings' (which includes 'Authentication Type', 'Configuration', 'NAT Rules', 'Properties', and 'Locks'), 'Monitoring' (with 'Metrics'), and 'Automation'. The right side displays 'Essentials' information for the connection, including its resource group (VaishRG1), status (Unknown), location (East US), subscription (Azure for Students), and various network gateway details. A 'JSON View' button is at the top right of the essentials panel.

8. Create virtual machine in Hub Network.

The screenshot shows the 'Create a virtual machine' wizard in the Microsoft Azure portal. The title bar says 'Create a virtual machine - Microsoft Azure'. The main form is titled 'Create a virtual machine'. It includes fields for 'Run with Azure Spot discount' (unchecked), 'Size' (set to 'Standard_DS1_v2 - 1 vcpu, 3.5 GiB memory (₹7,223.60/month)'), 'Administrator account' (with 'Username' set to 'VirtualMachineHub', 'Password' masked, and 'Confirm password' set to 'VirtualMachineHub@123456789'), and 'Inbound port rules' (set to 'Allow selected ports'). At the bottom, there are buttons for 'Review + create' and 'Next : Disks >'. The taskbar at the bottom shows various Windows icons and the date/time as 25-07-2023 00:18.

The screenshot shows the Microsoft Azure portal interface. The main title bar has two tabs: "VM-Hub-Vaish - Microsoft Azure" and "VN-OnPremiseVaish - Microsoft". The address bar shows the URL: https://portal.azure.com/#@msteams.mitaoe.ac.in/resource/subscriptions/5163d346-4fc8-4a78-b808-3dfcd618227... . The top navigation bar includes icons for search, refresh, and various account settings.

The left sidebar shows the navigation path: Home > VM-Hub-Vaish > Virtual machine. Below this are sections for Overview, Activity log, Access control (IAM), Tags, and Diagnose and solve problems. Under Settings, there are links for Networking, Connect, Windows Admin Center, Disks, Size, Microsoft Defender for Cloud, Advisor recommendations, Extensions + applications, and Availability + scaling.

The main content area displays the VM-Hub-Vaish virtual machine details. It includes a warning message: "VM-Hub-Vaish virtual machine agent status is not ready. Troubleshoot the issue →". The "Essentials" section provides information such as Resource group (VaishRG1), Status (Running), Location (East US), Subscription ID (5163d346-4fc8-4a78-b808-3dfcd618227), and Tags (edit). To the right, there is a "JSON View" button. The "Properties" tab is selected, followed by Monitoring, Capabilities (8), Recommendations, and Tutorials.

The bottom of the screen shows the Windows taskbar with various pinned icons and system status indicators like battery level, network, and date/time (00:31, 25-07-2023).

9. Set RRAS in host virtual machine at on-premises side.

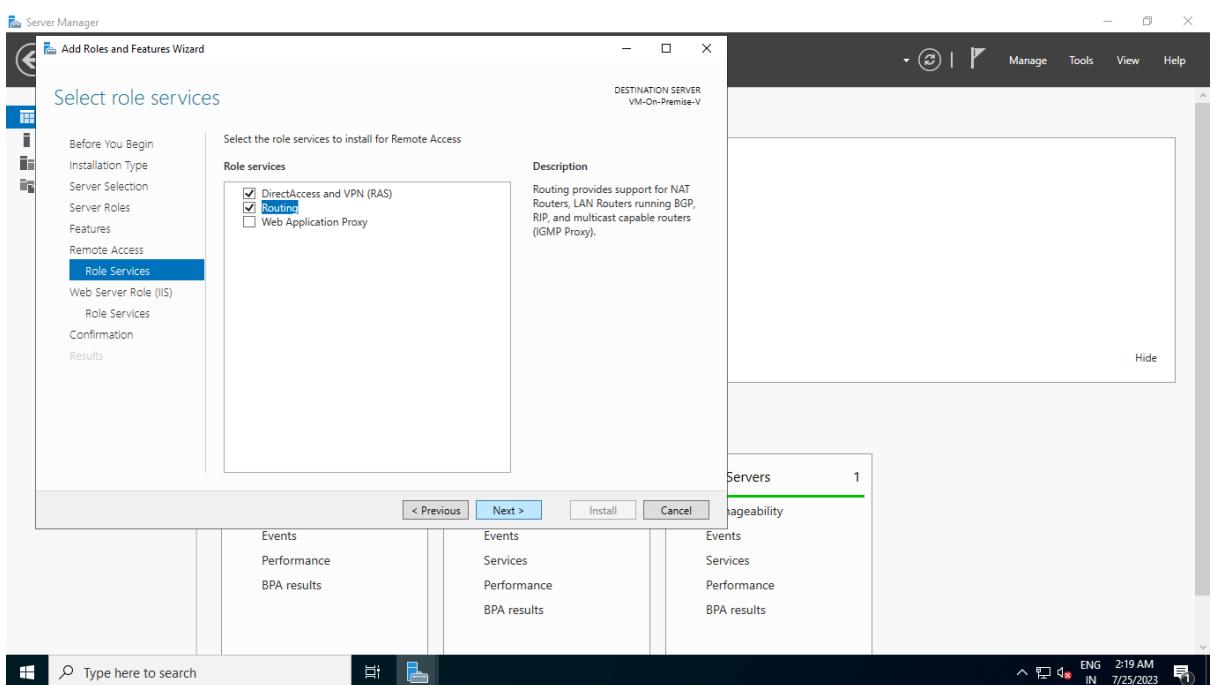
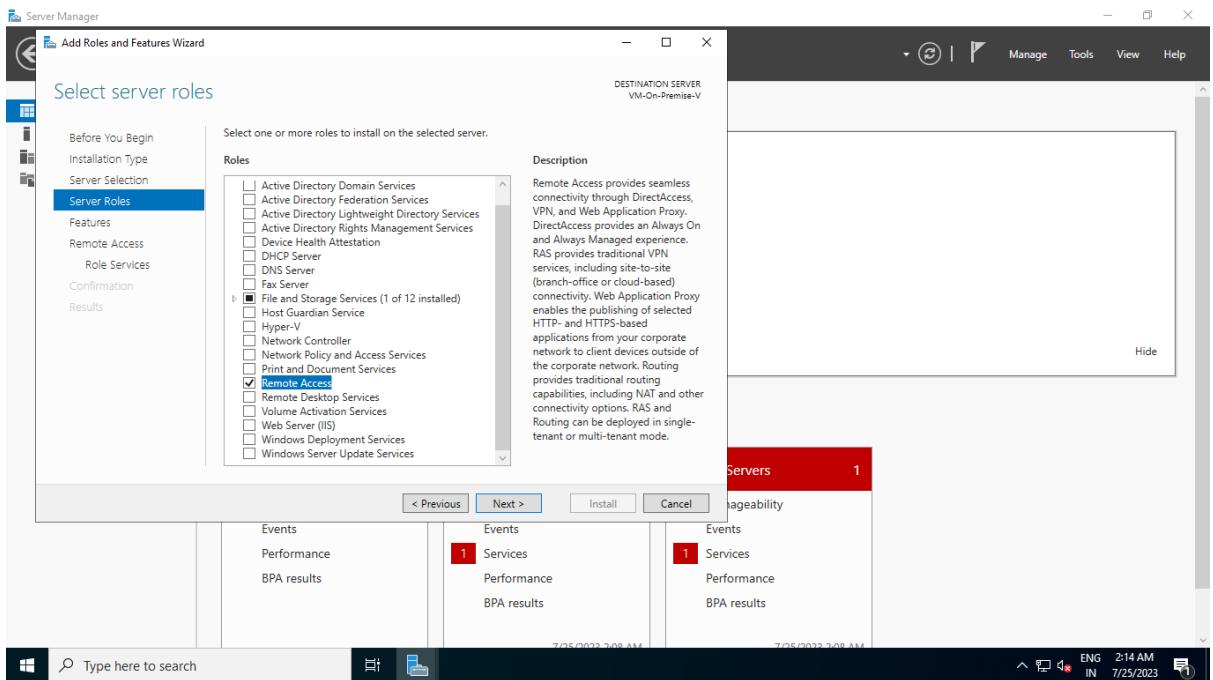
The screenshot shows the Server Manager dashboard. The top navigation bar includes "Manage", "Tools", "View", and "Help". The left sidebar shows "Dashboard", "Local Server", "All Servers", and "File and Storage Services".

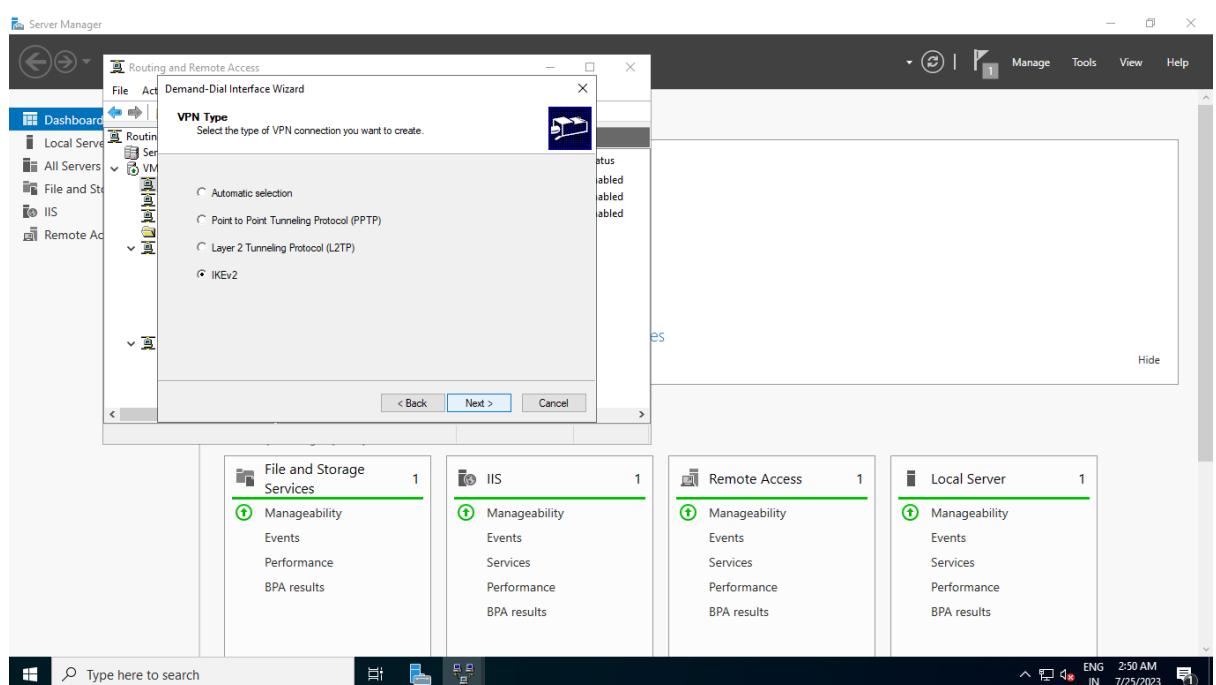
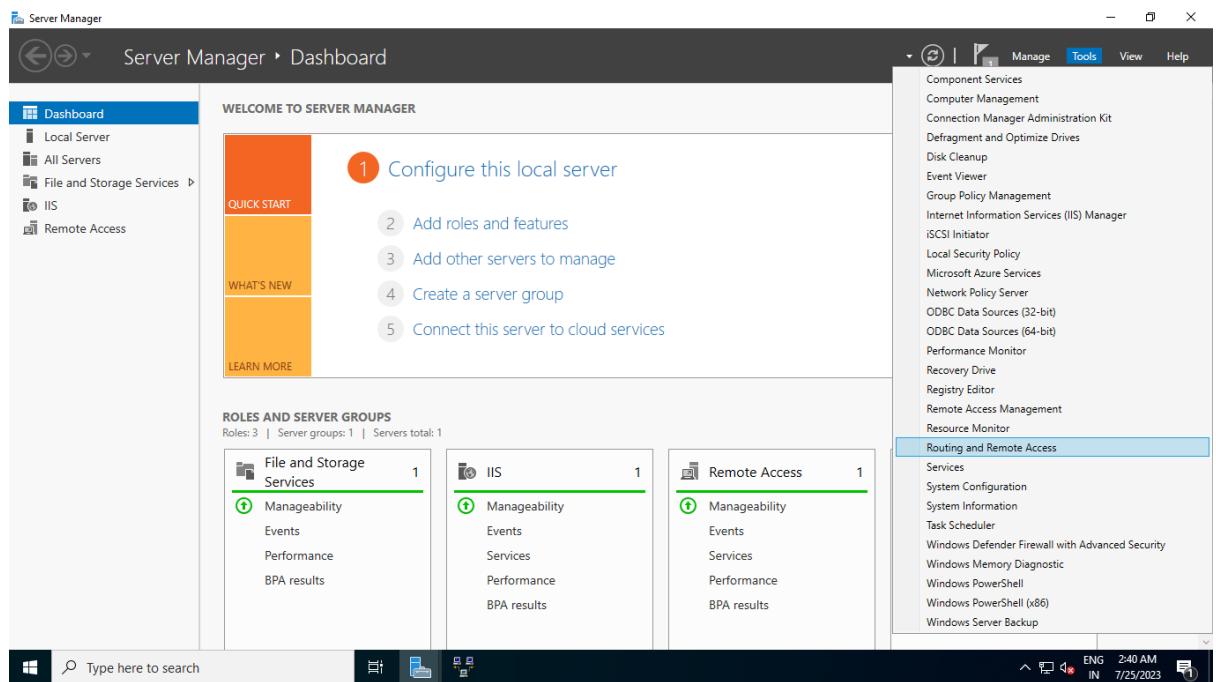
The main content area features a "WELCOME TO SERVER MANAGER" section with a "QUICK START" button and a "WHAT'S NEW" section. A numbered list of steps is displayed: 1. Configure this local server, 2. Add roles and features, 3. Add other servers to manage, 4. Create a server group, and 5. Connect this server to cloud services. There is also a "LEARN MORE" link and a "Hide" button.

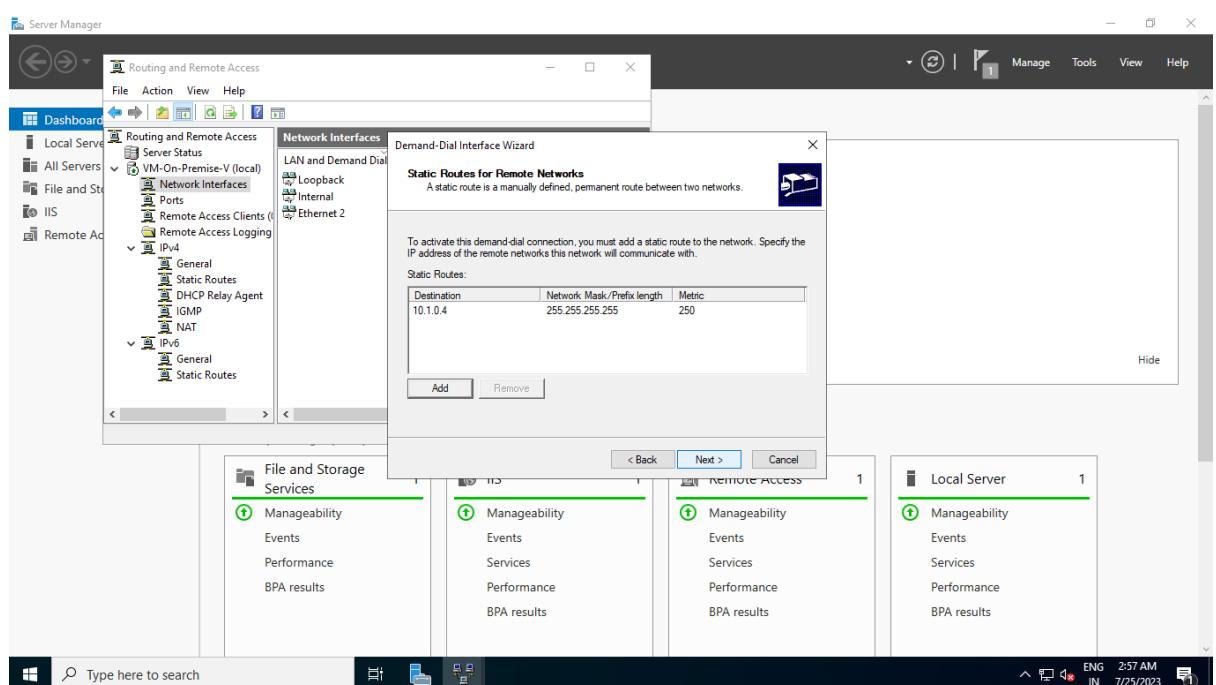
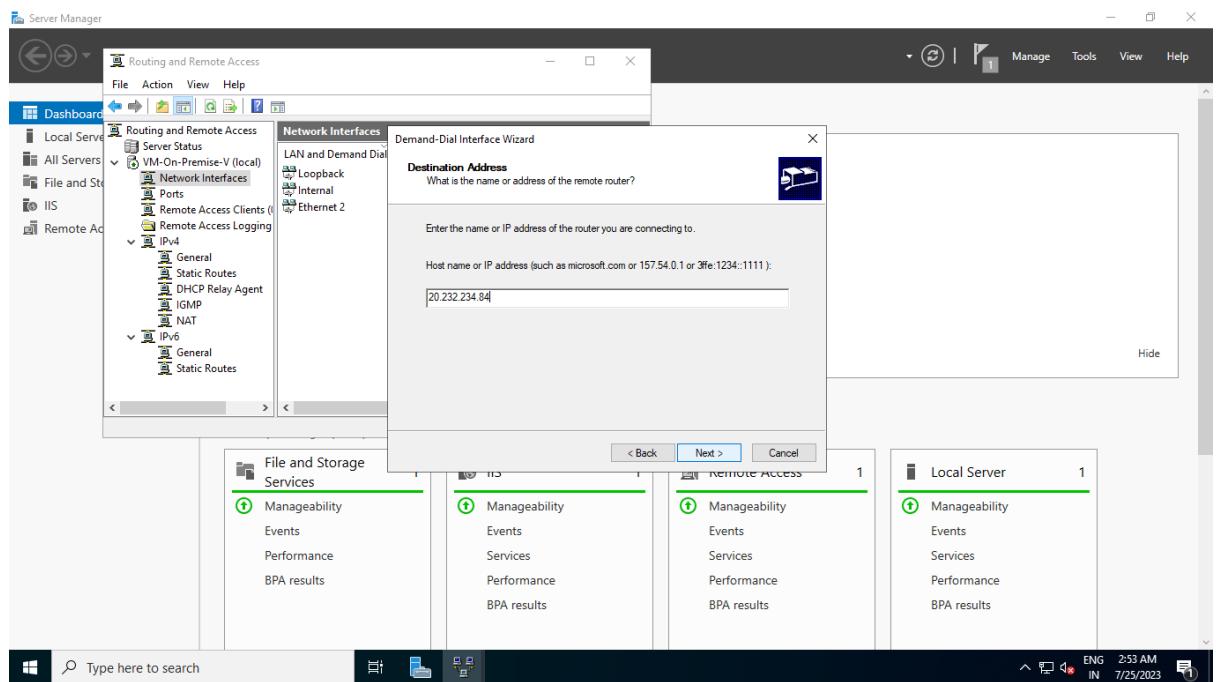
Below this, the "ROLES AND SERVER GROUPS" section shows the following data:

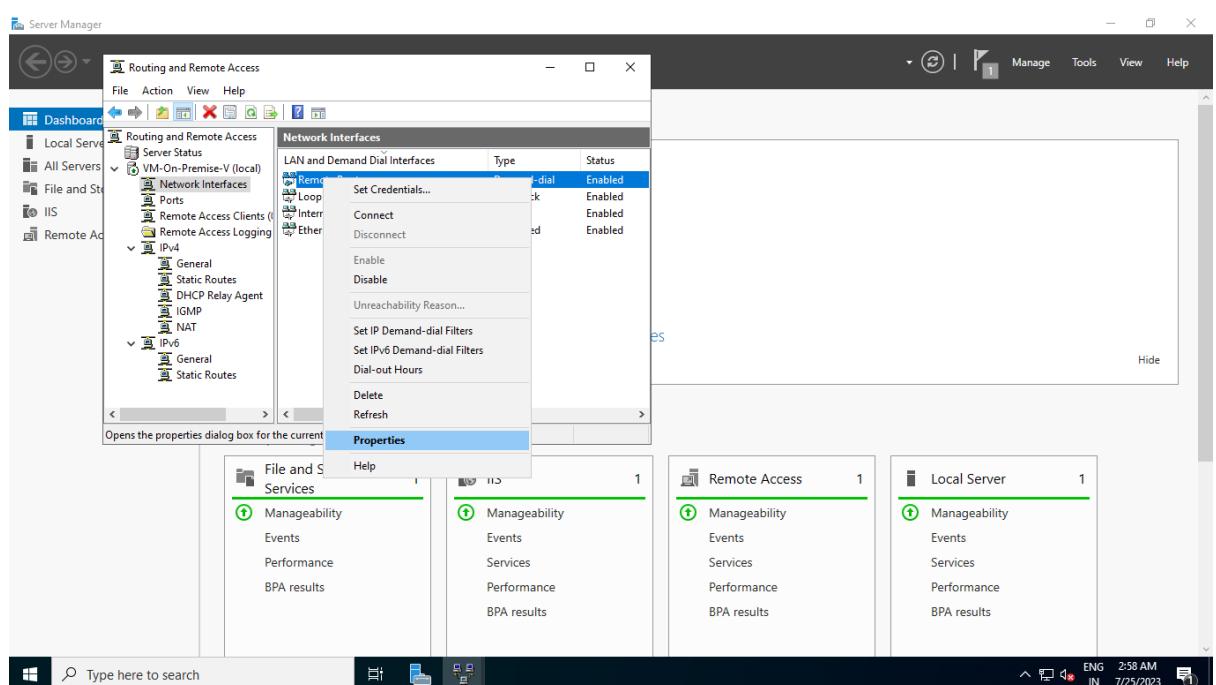
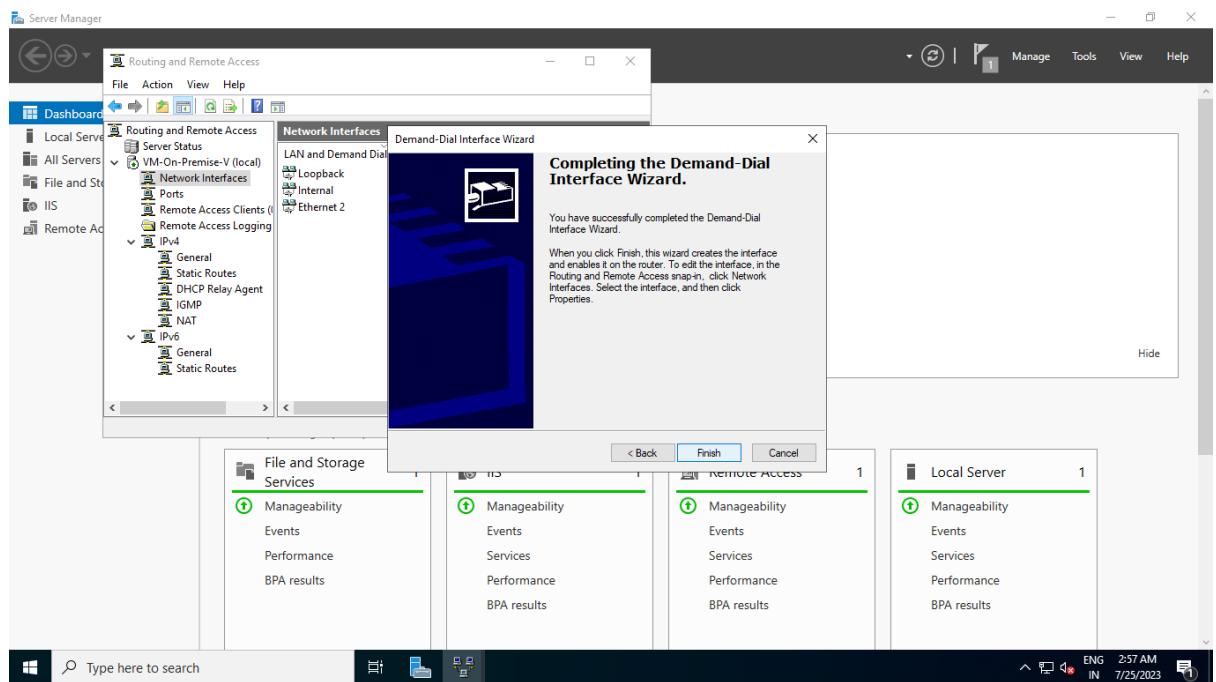
File and Storage Services	Local Server	All Servers
1 Manageability	1 Manageability	1 Manageability
Events	Events	Events
Performance	Performance	Performance
BPA results	BPA results	BPA results

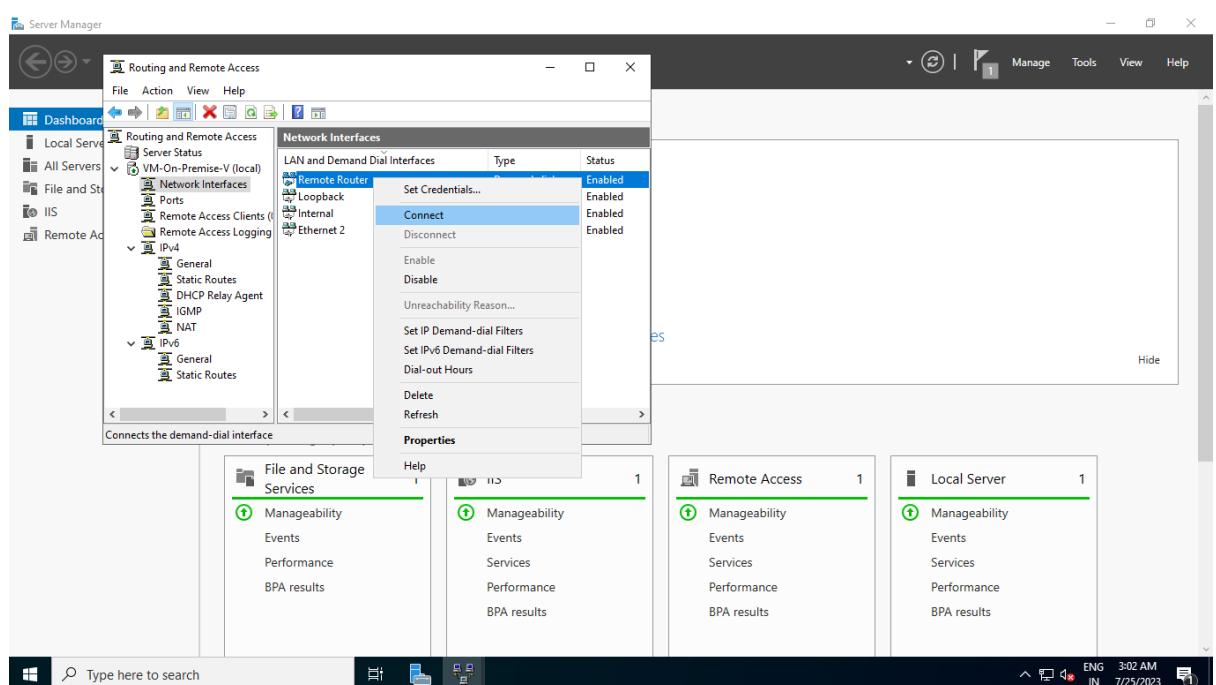
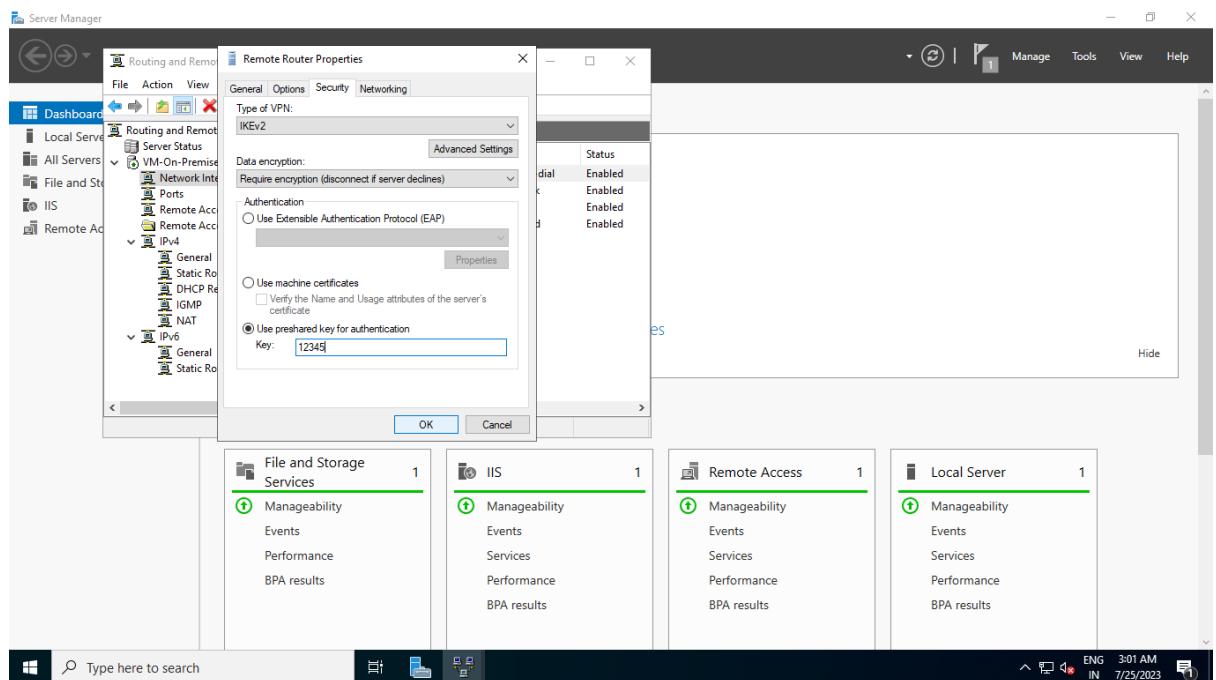
The bottom of the screen shows the Windows taskbar with various pinned icons and system status indicators like battery level, network, and date/time (2:10 AM, 7/25/2023).





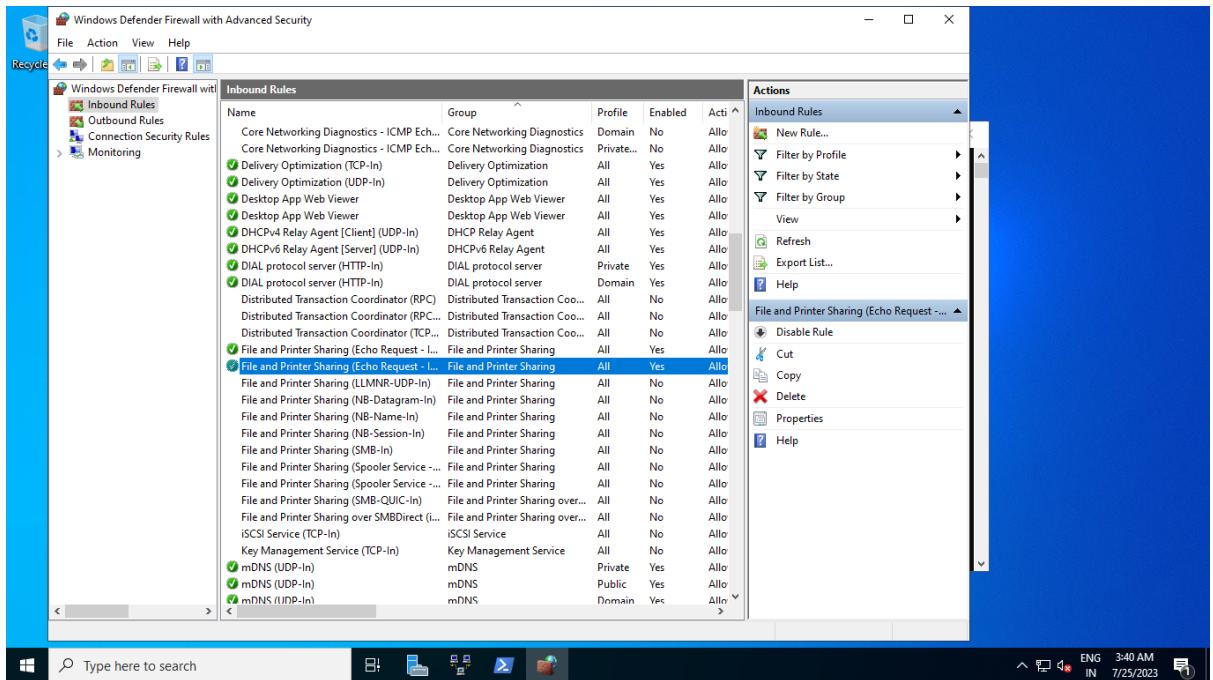




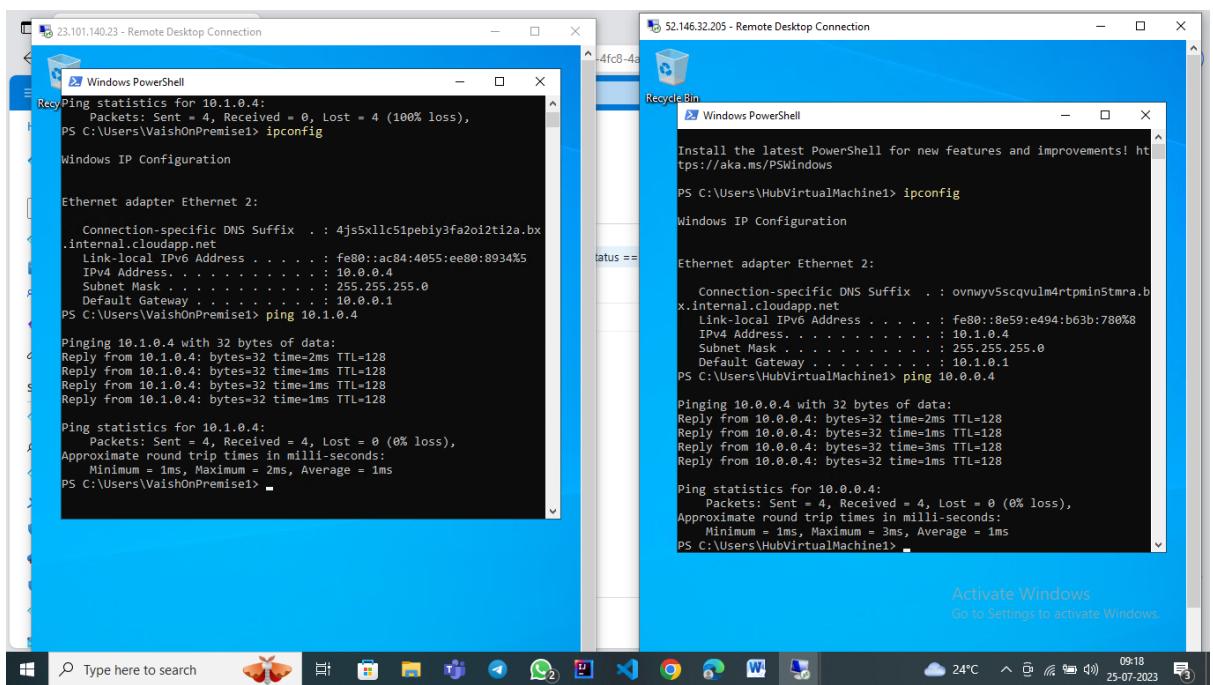


Here we have completed the RRAS Set up in our on-premise virtual machine.

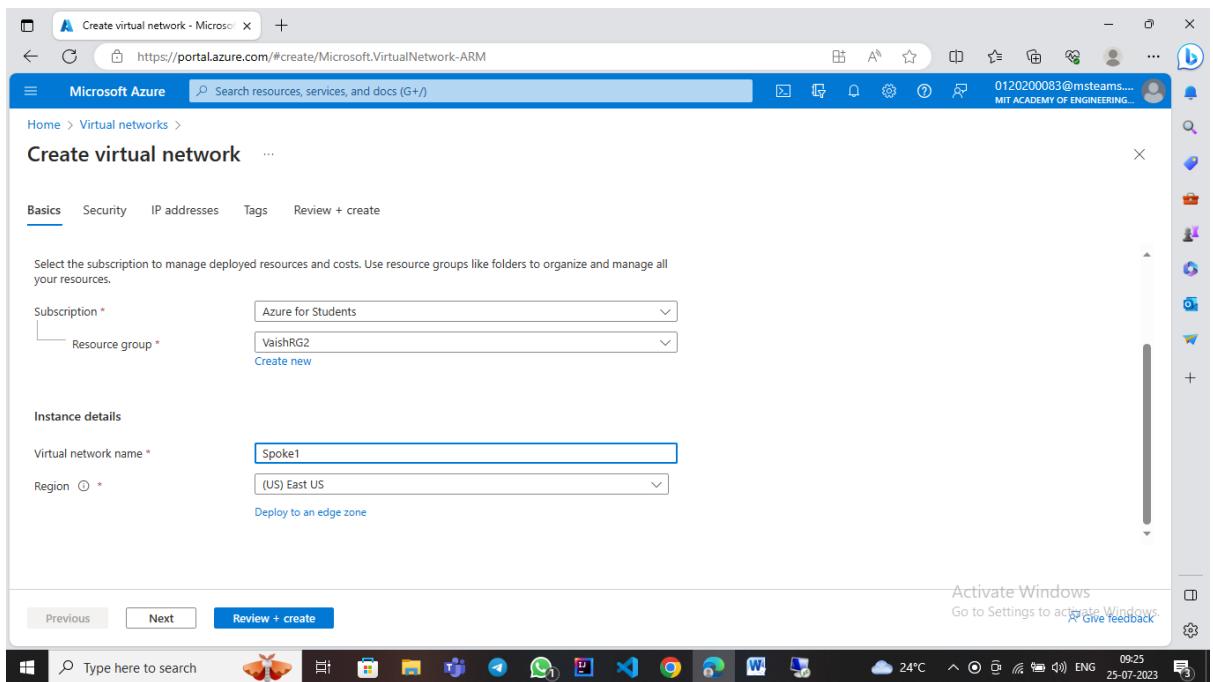
- Now open windows defender firewall and advanced security option and enable file and printer sharing rule in each Virtual Machine.



11. Now Connect both virtual machine from on-premise network and hub network using ping command in windows powershell.



12. Now create Spoke1 and Spoke 2 in different resource group that is VaishRG2.



Name	Resource group	Location	Subscription
Spoke1	VaishRG2	Central India	Azure for Students
Spoke2	VaishRG2	Central India	Azure for Students
VN-HUB	VaishRG1	East US	Azure for Students
VN-OnPremiseVaish	VaishRG1	East US	Azure for Students

13. Now add gateway subnet in both Spoke1 and Spoke2.

Spoke1 | Subnets

Name	IPv4	IPv6	Available IPs	Delegated to
default	10.2.0.0/24	-	251	-
GatewaySubnet	10.2.1.0/24	-	availability dependent	-

Spoke2 | Subnets

Successfully added subnet

Name	IPv4	IPv6	Available IPs	Delegated to
default	10.3.0.0/24	-	251	-
GatewaySubnet	10.3.1.0/24	-	availability dependent	-

14. Now create the virtual machine in Spoke1 and Spoke2.

Create a virtual machine

VM architecture: x64
⚠️ Arm64 is not supported with the selected image.

Run with Azure Spot discount:

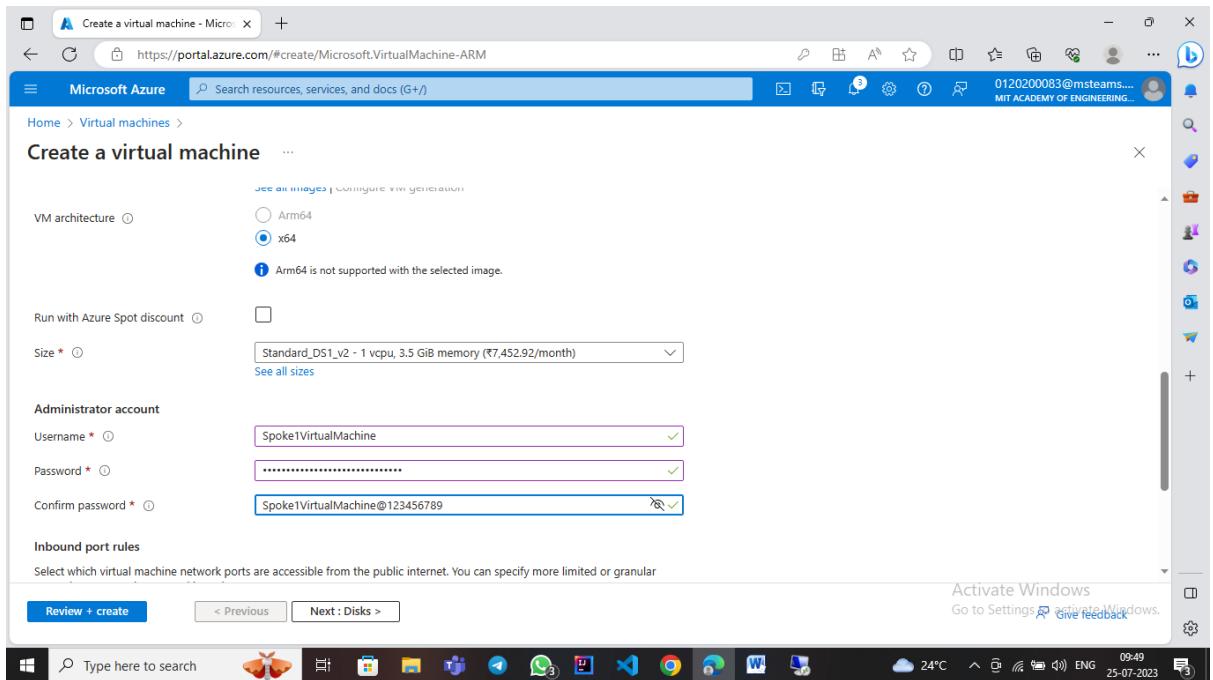
Size: Standard_DS1_v2 - 1 vcpu, 3.5 GiB memory (₹7,452.92/month)
See all sizes

Administrator account:

Username: Spoke1VirtualMachine
Password: ██████████
Confirm password: Spoke1VirtualMachine@123456789

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.

Review + create < Previous Next : Disks >



Create a virtual machine

VM architecture: x64
⚠️ Arm64 is not supported with the selected image.

Run with Azure Spot discount:

Size: Standard_DS1_v2 - 1 vcpu, 3.5 GiB memory (₹7,452.92/month)
See all sizes

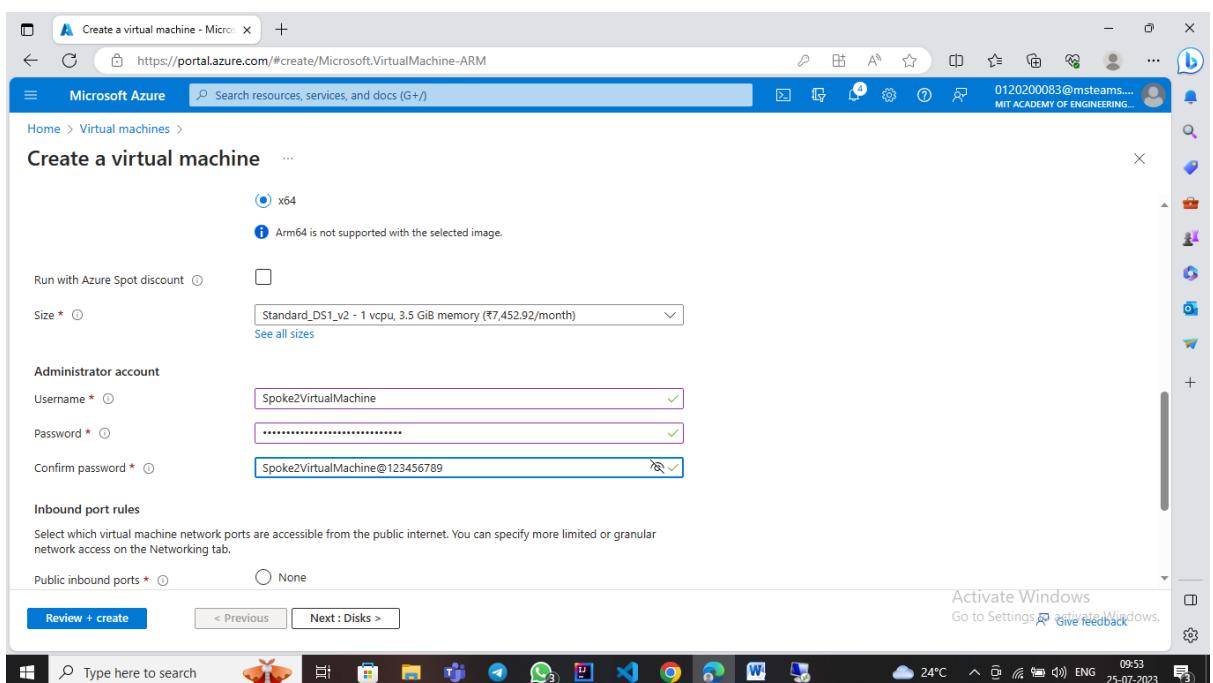
Administrator account:

Username: Spoke2VirtualMachine
Password: ██████████
Confirm password: Spoke2VirtualMachine@123456789

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

Review + create < Previous Next : Disks >



The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes 'Virtual machines - Microsoft Azure' and the URL 'https://portal.azure.com/#view/HubsExtension/BrowseResource/resourceType/Microsoft.Compute%2FVirtualMachines'. The main content area is titled 'Virtual machines' and displays a table of four virtual machines. The columns include Name, Type, Subscription, Resource group, Location, Status, Operating system, Size, and Price. The VMs listed are Spoke1-VM, Spoke2-VM, VM-Hub-Vaish, and VM-On-Premise-Vaish. The status for Spoke1-VM is 'Running', while the others are either 'Creating' or 'Running'. The operating system for all is Windows. The size is Standard_DS1_v2 for three and Standard_DS1_v2 for one. The price per hour is 4.20 for Spoke1-VM, 20 for Spoke2-VM, 52 for VM-Hub-Vaish, and 23 for VM-On-Premise-Vaish. The location for Spoke1-VM is Central India, while the others are East US. The resource group for all is VaishRG1. The subscription is 'Azure for Students'. The table has various filters at the top: 'Filter for any field...', 'Subscription equals all', 'Type equals all', 'Resource group equals all', 'Location equals all', and 'Add filter'. The bottom of the page shows a navigation bar with 'Activate Windows' and a search bar.

15. Now add transit peering in between Hub and Spokes.

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes 'VN-HUB - Microsoft Azure' and the URL 'https://portal.azure.com/#@msteams.mitaoe.ac.in/resource/subscriptions/5163d346-4fc8-4a78-b808-3dfcd618227/'. The main content area is titled 'Virtual networks' and shows a list of virtual networks: Spoke1, Spoke2, VN-HUB, and VN-OnPremiseVaish. The 'VN-HUB' item is selected and shown in detail on the right. The 'Peerings' tab is active, showing a search bar with 'peer'. The 'Essentials' section contains details such as Resource group (VaishRG1), Address space (10.1.0.0/16), Location (East US), Subscription (Azure for Students), and Subscription ID (5163d346-4fc8-4a78-b808-3dfcd618227). Other tabs include 'Properties', 'Topology', 'Properties', 'Capabilities', 'Recommendations', and 'Tutorials'. The bottom of the page shows a navigation bar with 'Activate Windows' and a search bar.

Add peerin... how to en... vNet peer... Troublesh... slack - Sea... Login | Sla... summer-in... vpn gateway... Azure Virt... Microsoft Azure Search resources, services, and docs (G+)

Home > VN-HUB | Peerings >

Add peering

VN-HUB

This virtual network

Peering link name *

 ✓

Traffic to remote virtual network ⓘ

Allow (default)

Block all traffic to the remote virtual network

Traffic forwarded from remote virtual network ⓘ

Allow (default)

Block traffic that originates from outside the remote virtual network

Virtual network gateway or Route Server ⓘ

Use this virtual network's gateway or Route Server

Use the remote virtual network's gateway or Route Server

None (default)

Remote virtual network

Peering link name *

 ✓

Add

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

Home > VN-HUB | Peerings >

Add peering

VN-HUB

I know my resource ID ⓘ

Subscription * ⓘ

Azure for Students

Virtual network *

Spoke1

Traffic to remote virtual network ⓘ

Allow (default)

Block all traffic to the remote virtual network

Traffic forwarded from remote virtual network ⓘ

Allow (default)

Block traffic that originates from outside the remote virtual network

Virtual network gateway or Route Server ⓘ

Use this virtual network's gateway or Route Server

Use the remote virtual network's gateway or Route Server

None (default)

Add

Activate Windows
Go to Settings to activate Windows.

Microsoft Azure | https://portal.azure.com/#view/Microsoft_Azure_Network/VirtualNetworkPeeringBladeViewModel/isAdd-/true/virtual... | 0120200083@msteams... MIT ACADEMY OF ENGINEERING...

Home > VN-HUB | Peerings >

Add peering

VN-HUB

This virtual network

Peering link name *

 ✓

Traffic to remote virtual network ⓘ

Allow (default)

Block all traffic to the remote virtual network

Traffic forwarded from remote virtual network ⓘ

Allow (default)

Block traffic that originates from outside the remote virtual network

Virtual network gateway or Route Server ⓘ

Use this virtual network's gateway or Route Server

Use the remote virtual network's gateway or Route Server

None (default)

Remote virtual network

Peering link name *

 ✓

Add

Type here to search

Activate Windows
Go to Settings to activate Windows.

Cloud 25°C ENG 11:04 25-07-2023

Microsoft Azure | https://portal.azure.com/#view/Microsoft_Azure_Network/VirtualNetworkPeeringBladeViewModel/isAdd-/true/virtual... | 0120200083@msteams... MIT ACADEMY OF ENGINEERING...

Home > VN-HUB | Peerings >

Add peering

VN-HUB

I know my resource ID ⓘ

Subscription *

 ▼

Virtual network *

 ▼

Traffic to remote virtual network ⓘ

Allow (default)

Block all traffic to the remote virtual network

Traffic forwarded from remote virtual network ⓘ

Allow (default)

Block traffic that originates from outside the remote virtual network

Virtual network gateway or Route Server ⓘ

Use this virtual network's gateway or Route Server

Use the remote virtual network's gateway or Route Server

None (default)

Add

Type here to search

Activate Windows
Go to Settings to activate Windows.

Cloud 25°C ENG 11:04 25-07-2023

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes links for Home, VN-HUB, and VN-HUB | Peerings. The main content area is titled "VN-HUB | Peerings" under "Virtual network". A search bar at the top right says "Search resources, services, and docs (G+)". Below the title, there's a "Settings" section with a "Peerings" tab selected. A table lists two entries: "hub-spoke1" and "hub-spoke2", both marked as "Connected" with "Spoke1" and "Spoke2" respectively, and both having "Enabled" status. The bottom of the screen shows the Windows taskbar with various pinned icons and the system tray indicating the date and time as 25-07-2023.

16. Now Connect the virtual machine of hub and Spoke1.

The image contains two side-by-side screenshots of Windows Remote Desktop sessions. Both sessions show a Windows PowerShell window. The left session (Hub VM) has the title "52.146.32.205 - Remote Desktop Connection". Its PowerShell output includes:

```

Minimum = 230ms, Maximum = 233ms, Average = 230ms
PS C:\Users\HubVirtualMachine1> ipconfig

Windows IP Configuration

Ethernet adapter Ethernet 2:

    Connection-specific DNS Suffix . : ovnwyv5scqvulm4rtppmin5tmra.bx.internal.cloudapp.net
    Link-local IPv6 Address . . . . . : fe80::8a59:e494:b63b:780%3
    IPv4 Address . . . . . : 10.1.0.4
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 10.1.0.1
PS C:\Users\HubVirtualMachine1> ping 10.2.0.4

Pinging 10.2.0.4 with 32 bytes of data:
Reply from 10.2.0.4: bytes=32 time=229ms TTL=128
Reply from 10.2.0.4: bytes=32 time=228ms TTL=128
Reply from 10.2.0.4: bytes=32 time=228ms TTL=128
Reply from 10.2.0.4: bytes=32 time=229ms TTL=128

Ping statistics for 10.2.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 228ms, Maximum = 229ms, Average = 228ms
PS C:\Users\HubVirtualMachine1>
  
```

The right session (Spoke1 VM) has the title "4.240.10.179 - Remote Desktop Connection". Its PowerShell output includes:

```

Administrator: Windows PowerShell
Approximate round trip times in milli-seconds:
    Minimum = 230ms, Maximum = 230ms, Average = 230ms
PS C:\Users\Spoke1VirtualMachine> ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

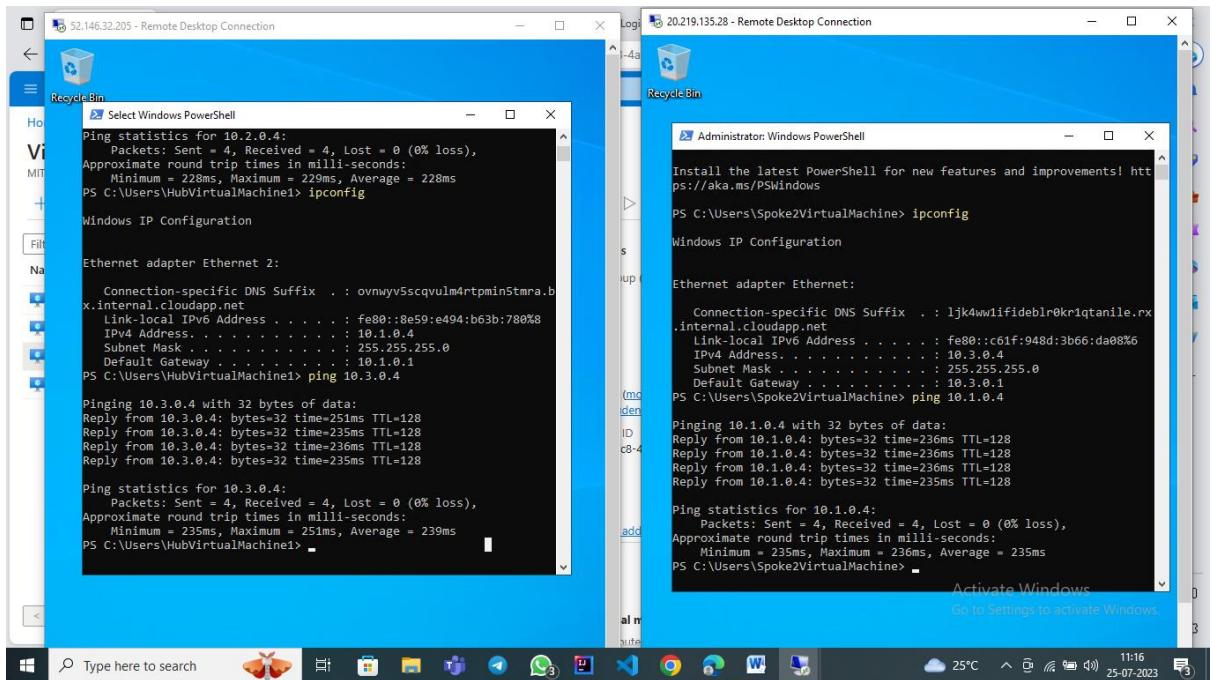
    Connection-specific DNS Suffix . : kxfjpjusiasiawermhb40bzgw134f.rx.internal.cloudapp.net
    Link-local IPv6 Address . . . . . : fe80::a628:1e55:dc90:c45d%6
    IPv4 Address . . . . . : 10.2.0.4
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 10.2.0.1
PS C:\Users\Spoke1VirtualMachine> ping 10.1.0.4

Pinging 10.1.0.4 with 32 bytes of data:
Reply from 10.1.0.4: bytes=32 time=229ms TTL=128
Reply from 10.1.0.4: bytes=32 time=228ms TTL=128
Reply from 10.1.0.4: bytes=32 time=228ms TTL=128
Reply from 10.1.0.4: bytes=32 time=230ms TTL=128

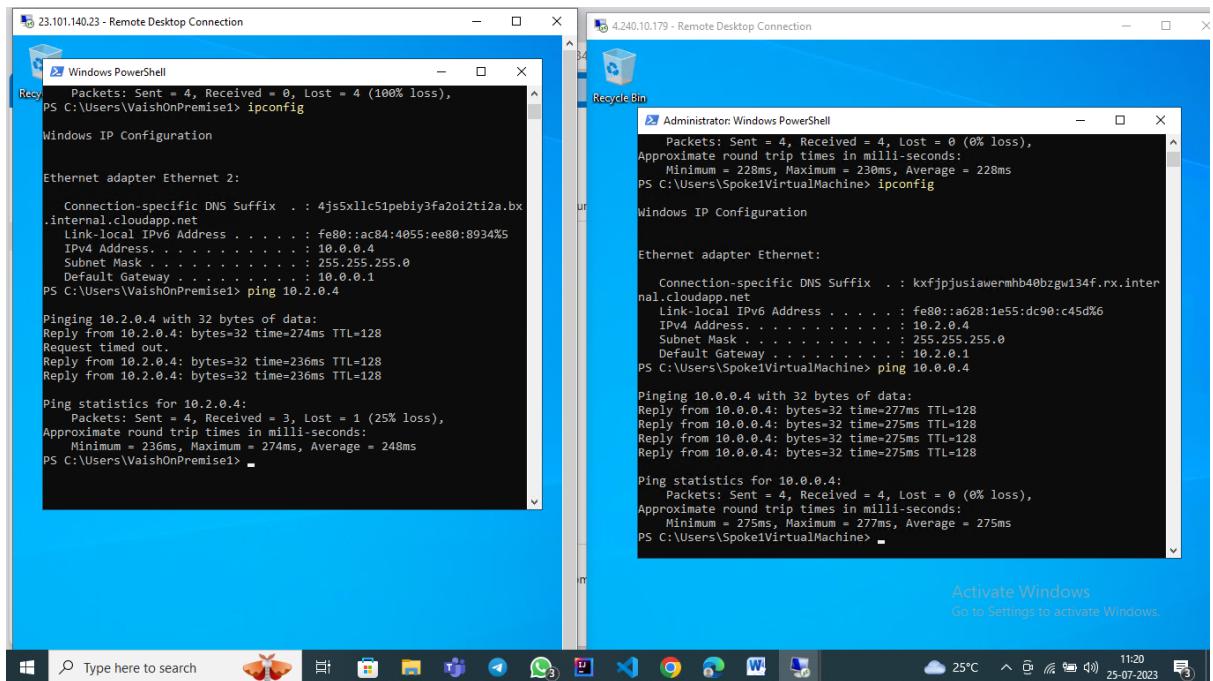
Ping statistics for 10.1.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 228ms, Maximum = 230ms, Average = 228ms
PS C:\Users\Spoke1VirtualMachine>
  
```

The bottom of the screen shows the Windows taskbar with various pinned icons and the system tray indicating the date and time as 25-07-2023.

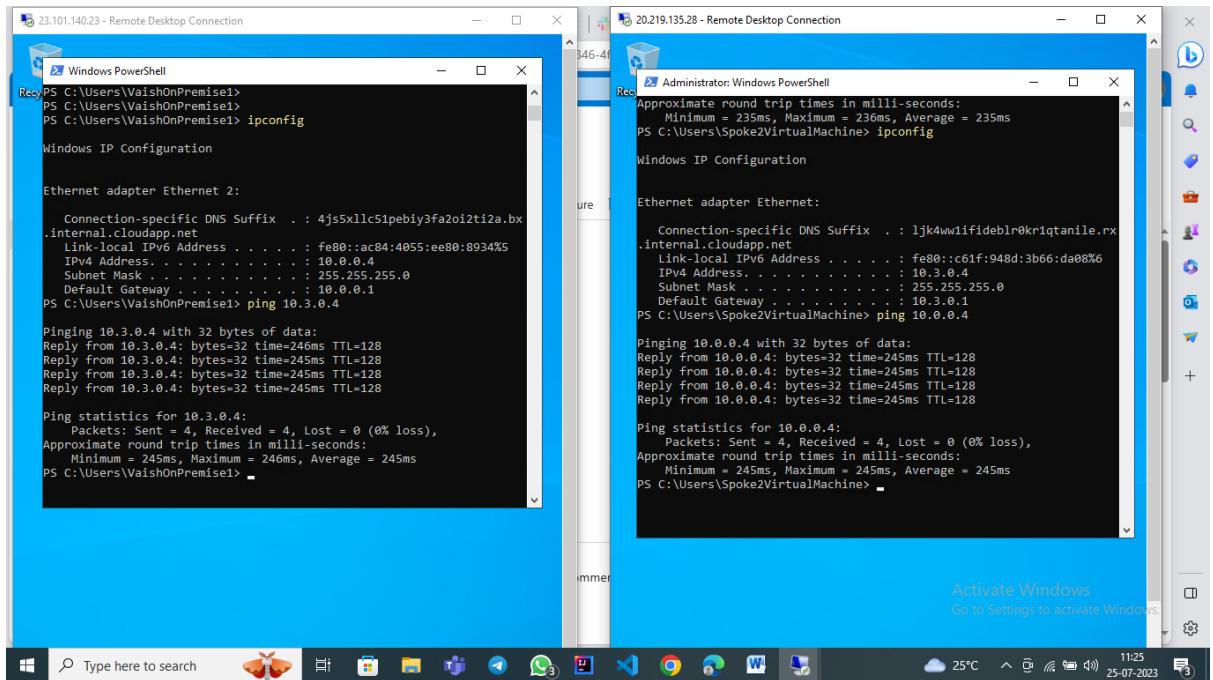
17. Now connect the virtual machine of Hub and Spoke2.



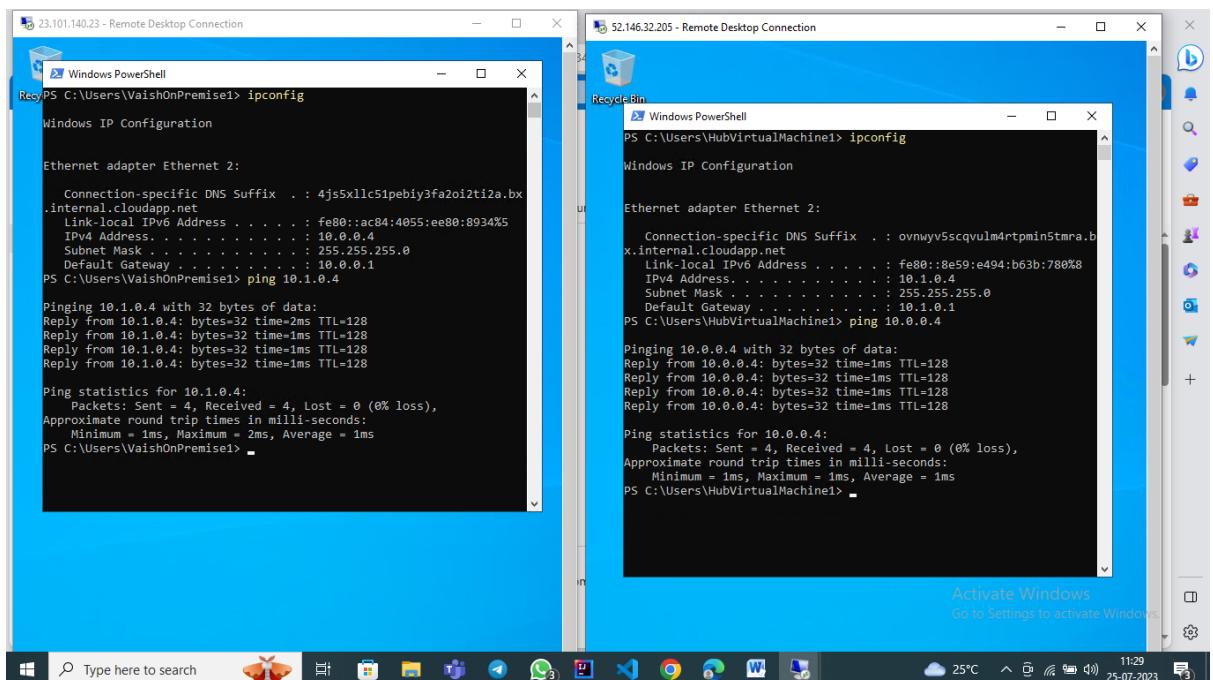
18. Now connect the On-Premise Virtual machine with Spoke1.



19. Now connect the On-Premise Virtual machine with Spoke2.



20. Connect On-Premise Virtual machine with Hub VM.



21. Here are some more screen shots of Project Implementation.

Windows 10.0.4.4 with 32 Bytes of data:
Reply from 10.0.0.4: bytes=32 time=1ms TTL=128
Reply from 10.0.0.4: bytes=32 time=1ms TTL=128
Reply from 10.0.0.4: bytes=32 time=1ms TTL=128
Reply from 10.0.0.4: bytes=32 time=1ms TTL=128

Ping statistics for 10.0.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 1ms, Average = 1ms

PS C:\Users\VaishnavPremise1> ping 10.1.0.4

Pinging 10.1.0.4 with 32 bytes of data:
Reply from 10.1.0.4: bytes=32 time=2ms TTL=128
Reply from 10.1.0.4: bytes=32 time=1ms TTL=128
Reply from 10.1.0.4: bytes=32 time=1ms TTL=128
Reply from 10.1.0.4: bytes=32 time=1ms TTL=128

Ping statistics for 10.1.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 1ms, Average = 1ms

PS C:\Users\VaishnavPremise1> ping 10.2.0.4

Pinging 10.2.0.4 with 32 bytes of data:
Reply from 10.2.0.4: bytes=32 time=241ms TTL=128
Reply from 10.2.0.4: bytes=32 time=248ms TTL=128
Reply from 10.2.0.4: bytes=32 time=248ms TTL=128
Reply from 10.2.0.4: bytes=32 time=241ms TTL=128

Ping statistics for 10.2.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 241ms, Maximum = 248ms, Average = 244ms

PS C:\Users\HubVirtualMachine1> ping 10.2.0.4

Pinging 10.2.0.4 with 32 bytes of data:
Reply from 10.2.0.4: bytes=32 time=241ms TTL=128
Reply from 10.2.0.4: bytes=32 time=248ms TTL=128
Reply from 10.2.0.4: bytes=32 time=248ms TTL=128
Reply from 10.2.0.4: bytes=32 time=241ms TTL=128

Ping statistics for 10.2.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 241ms, Maximum = 248ms, Average = 244ms

PS C:\Users\HubVirtualMachine1> ping 10.2.0.4

Pinging 10.2.0.4 with 32 bytes of data:
Reply from 10.2.0.4: bytes=32 time=241ms TTL=128
Reply from 10.2.0.4: bytes=32 time=248ms TTL=128
Reply from 10.2.0.4: bytes=32 time=248ms TTL=128
Reply from 10.2.0.4: bytes=32 time=241ms TTL=128

Ping statistics for 10.2.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 241ms, Maximum = 248ms, Average = 244ms

PS C:\Users\SpokeVirtualMachine> ping 10.0.0.4

Pinging 10.0.0.4 with 32 bytes of data:
Reply from 10.0.0.4: bytes=32 time=277ms TTL=128
Reply from 10.0.0.4: bytes=32 time=275ms TTL=128
Reply from 10.0.0.4: bytes=32 time=275ms TTL=128
Reply from 10.0.0.4: bytes=32 time=275ms TTL=128

Ping statistics for 10.0.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 275ms, Maximum = 277ms, Average = 276ms

PS C:\Users\SpokeVirtualMachine> ping 10.0.0.4

Pinging 10.0.0.4 with 32 bytes of data:
Reply from 10.0.0.4: bytes=32 time=245ms TTL=128
Reply from 10.0.0.4: bytes=32 time=244ms TTL=128
Reply from 10.0.0.4: bytes=32 time=244ms TTL=128
Reply from 10.0.0.4: bytes=32 time=245ms TTL=128

Ping statistics for 10.0.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 244ms, Maximum = 245ms, Average = 244ms

PS C:\Users\SpokeVirtualMachine> ping 10.0.0.4

```
23.101.140.23 - Remote Desktop Connection
Default Gateway . . . . . : 10.0.0.1
PS C:\Users\WalishOnPremise> ping 10.1.0.4

Pinging 10.1.0.4 with 32 bytes of data:
Reply from 10.1.0.4: bytes=32 time=2ms TTL=128
Reply from 10.1.0.4: bytes=32 time=1ms TTL=128
Reply from 10.1.0.4: bytes=32 time=1ms TTL=128
Reply from 10.1.0.4: bytes=32 time=1ms TTL=128

Ping statistics for 10.1.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms
PS C:\Users\WalishOnPremise> ping 10.2.0.4

Pinging 10.2.0.4 with 32 bytes of data:
Reply from 10.2.0.4: bytes=32 time=24ms TTL=128
Reply from 10.2.0.4: bytes=32 time=240ms TTL=128
Reply from 10.2.0.4: bytes=32 time=240ms TTL=128
Reply from 10.2.0.4: bytes=32 time=241ms TTL=128

Ping statistics for 10.2.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 240ms, Maximum = 241ms, Average = 240ms
PS C:\Users\HubVirtualMachine> 10.3.0.4
PS C:\Users\HubVirtualMachine> ping 10.3.0.4

Pinging 10.3.0.4 with 32 bytes of data:
Reply from 10.3.0.4: bytes=32 time=236ms TTL=128

A 24.0.10.179 - Remote Desktop Connection
PS C:\Users\Spoke1VirtualMachine> ping 10.0.0.4

Pinging 10.0.0.4 with 32 bytes of data:
Reply from 10.0.0.4: bytes=32 time=244ms TTL=128
Reply from 10.0.0.4: bytes=32 time=244ms TTL=128
Reply from 10.0.0.4: bytes=32 time=244ms TTL=128
Reply from 10.0.0.4: bytes=32 time=243ms TTL=128

Ping statistics for 10.0.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 243ms, Maximum = 244ms, Average = 243ms
PS C:\Users\Spoke1VirtualMachine> ping 10.1.0.4

Pinging 10.1.0.4 with 32 bytes of data:
Reply from 10.1.0.4: bytes=32 time=231ms TTL=128
Reply from 10.1.0.4: bytes=32 time=230ms TTL=128

<-->
```

The screenshot shows two separate Remote Desktop sessions running on Windows 10. Both sessions have multiple windows open, each displaying the output of a 'ping' command.

Session 1 (Left):

- Window 1: PS C:\Users\VaishOnPremise1> ping 10.2.0.4


```
Pinging 10.2.0.4 with 32 bytes of data:
Reply from 10.2.0.4: bytes=32 time=255ms TTL=128
Reply from 10.2.0.4: bytes=32 time=244ms TTL=128
Reply from 10.2.0.4: bytes=32 time=244ms TTL=128
Reply from 10.2.0.4: bytes=32 time=244ms TTL=128

Ping statistics for 10.2.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 244ms, Maximum = 255ms, Average = 246ms
```
- Window 2: PS C:\Users\VaishOnPremise1> ping 10.3.0.4


```
Pinging 10.3.0.4 with 32 bytes of data:
Reply from 10.3.0.4: bytes=32 time=236ms TTL=128

Ping statistics for 10.3.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 236ms, Maximum = 236ms, Average = 236ms
```
- Window 3: PS C:\Users\Spoke1VirtualMachine> ping 10.0.0.4


```
Pinging 10.0.0.4 with 32 bytes of data:
Reply from 10.0.0.4: bytes=32 time=244ms TTL=128
Reply from 10.0.0.4: bytes=32 time=244ms TTL=128
Reply from 10.0.0.4: bytes=32 time=244ms TTL=128
Reply from 10.0.0.4: bytes=32 time=243ms TTL=128

Ping statistics for 10.0.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 243ms, Maximum = 244ms, Average = 243ms
```
- Window 4: PS C:\Users\Spoke1VirtualMachine> ping 10.1.0.4


```
Pinging 10.1.0.4 with 32 bytes of data:
Reply from 10.1.0.4: bytes=32 time=231ms TTL=128
Reply from 10.1.0.4: bytes=32 time=230ms TTL=128

Ping statistics for 10.1.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 230ms, Maximum = 231ms, Average = 230.5ms
```

Session 2 (Right):

- Window 1: PS C:\Users\HubVirtualMachine1> ping 10.3.0.4


```
Pinging 10.3.0.4 with 32 bytes of data:
Reply from 10.3.0.4: bytes=32 time=236ms TTL=128

Ping statistics for 10.3.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 236ms, Maximum = 236ms, Average = 236ms
```
- Window 2: PS C:\Users\HubVirtualMachine1> ping 10.1.0.4


```
Pinging 10.1.0.4 with 32 bytes of data:
Reply from 10.1.0.4: bytes=32 time<1ms TTL=128

Ping statistics for 10.1.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = <1ms, Maximum = <1ms, Average = <1ms
```
- Window 3: PS C:\Users\Spoke2VirtualMachine> ping 10.0.0.4


```
Pinging 10.0.0.4 with 32 bytes of data:
Reply from 10.0.0.4: bytes=32 time=245ms TTL=128
Reply from 10.0.0.4: bytes=32 time=250ms TTL=128
Reply from 10.0.0.4: bytes=32 time=245ms TTL=128
Reply from 10.0.0.4: bytes=32 time=245ms TTL=128

Ping statistics for 10.0.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 245ms, Maximum = 250ms, Average = 246ms
```
- Window 4: PS C:\Users\Spoke2VirtualMachine> ping 10.1.0.4


```
Pinging 10.1.0.4 with 32 bytes of data:
Reply from 10.1.0.4: bytes=32 time=236ms TTL=128
Reply from 10.1.0.4: bytes=32 time=236ms TTL=128

Ping statistics for 10.1.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 236ms, Maximum = 236ms, Average = 236ms
```

END OF THE REPORT

THANK YOU