

Name: Chaitra N

SRN: R24TF014

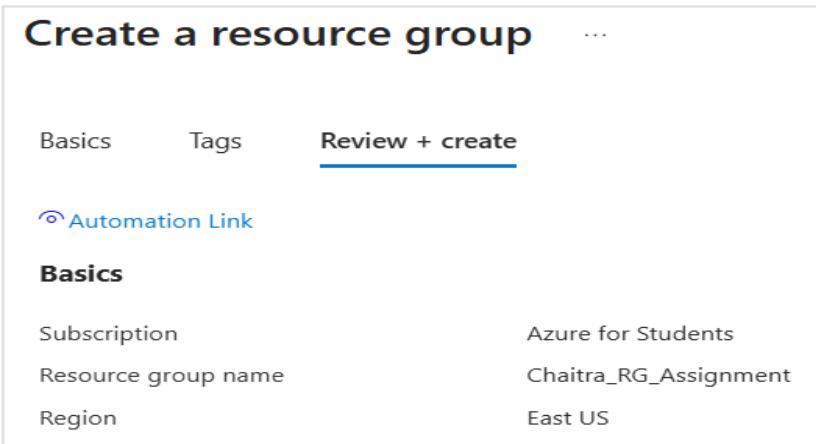
Date: 11-07-2025

Module Name: Fundamentals of Cloud Az-900

Deployment of Azure Infrastructure

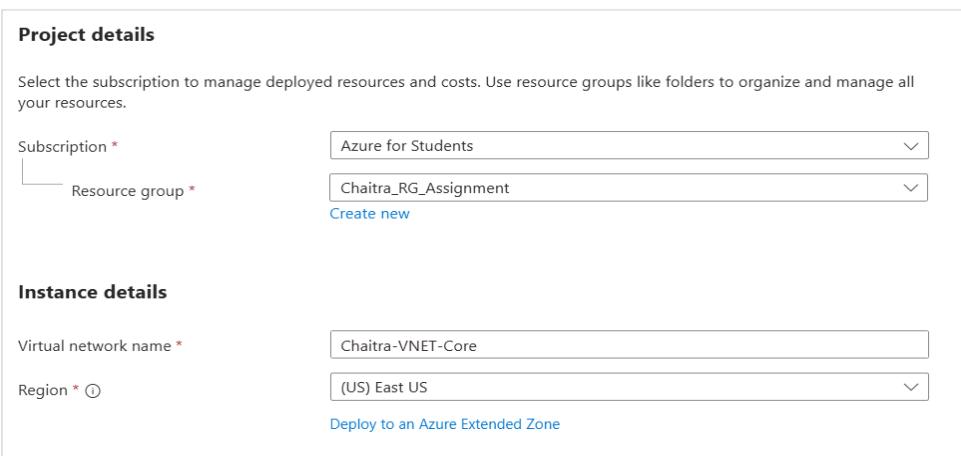
1. Create Resource Group and Virtual Network

1.1 Create the Resource Group – Chaitra_RG_Assignment at EastUS region and create First VNET Chaitra-VNET-Core with CIDR 192.168.0.0/16 at EastUS region.

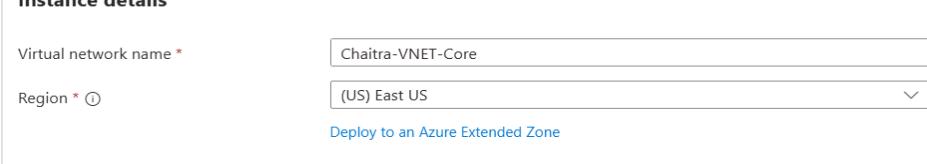


The screenshot shows the 'Create a resource group' wizard in the 'Review + create' step. It includes tabs for 'Basics', 'Tags', and 'Review + create'. Below the tabs, there's an 'Automation Link' button. The 'Basics' section displays the following information:

Subscription	Azure for Students
Resource group name	Chaitra_RG_Assignment
Region	East US



The 'Project details' section allows selecting a subscription and resource group. The 'Subscription' dropdown is set to 'Azure for Students' and the 'Resource group' dropdown is set to 'Chaitra_RG_Assignment'. There is also a 'Create new' link.



The 'Instance details' section specifies the virtual network name as 'Chaitra-VNET-Core' and the region as '(US) East US'. A 'Deploy to an Azure Extended Zone' link is also present.

Click on Next to Assign CIDR with 192.168.0.0/16 and create two subnets as:

- WebTier subnet: 192.168.10.0/24
- MgmtSubnet subnet: 192.168.20.0/24

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192.168.0.0/16	Delete address space		
<input type="text" value="192.168.0.0"/> /16	▼		
192.168.0.0 - 192.168.255.255	65,536 addresses		
<hr/>			
Subnets	IP address range	Size	NAT gateway
WebTier	192.168.10.0 - 192.168.10.255 /24 (256 addresses)	-	
MgmtSubnet	192.168.20.0 - 192.168.20.255 /24 (256 addresses)	-	

Click Next to review and create

Basics	Security	IP addresses	Tags	Review + create
Subscription				Azure for Students
Resource Group				Chaitra_RG_Assignment
Name				Chaitra-VNET-Core
Region				East US
Security				
Azure Bastion				Disabled
Azure Firewall				Disabled
Azure DDoS Network Protection				Disabled
IP addresses				
Address space				192.168.0.0/16 (65,536 addresses)
Subnet				WebTier (192.168.10.0/24) (256 addresses)
Subnet				MgmtSubnet (192.168.20.0/24) (256 addresses)

1.2 Create the Second VNET in the Name of Chaitra-VNET-Services with CIDR 10.10.0.0/16

Project details	
Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.	
Subscription *	<input type="text" value="Azure for Students"/>
Resource group *	<input type="text" value="Chaitra_RG_Assignment"/> Create new
<hr/>	
Instance details	
Virtual network name *	<input type="text" value="Chaitra-VNET-Services"/>
Region *	<input type="text" value="(US) East US"/>
Deploy to an Azure Extended Zone	

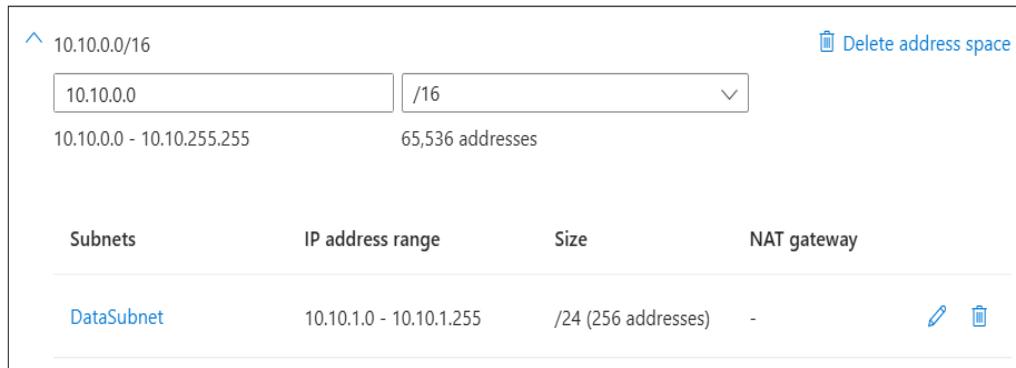
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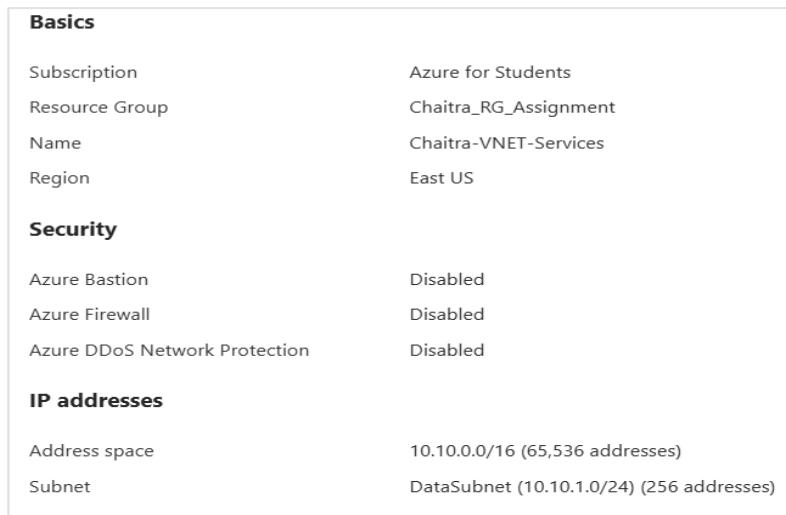
Click on Next to Assign CIDR with 10.10.0.0/16 and DataSubnet subnet: 10.10.1.0/24



The screenshot shows the configuration of a new address space and subnet. The address space is set to 10.10.0.0/16, covering the range 10.10.0.0 - 10.10.255.255, which includes 65,536 addresses. A single subnet named "DataSubnet" is defined under this address space, with an IP address range of 10.10.1.0 - 10.10.1.255, a size of /24 (256 addresses), and no NAT gateway assigned.

Subnets	IP address range	Size	NAT gateway
DataSubnet	10.10.1.0 - 10.10.1.255	/24 (256 addresses)	-

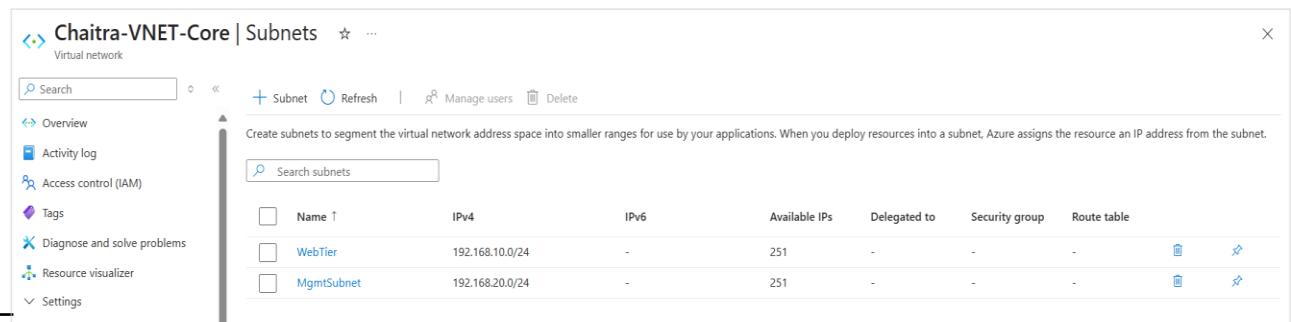
Click Next to review and create



The screenshot displays the "Basics" configuration page for a new Virtual Network (VNET). The configuration includes:

- Subscription:** Azure for Students
- Resource Group:** Chaitra_RG_Assignment
- Name:** Chaitra-VNET-Services
- Region:** East US
- Security:**
 - Azure Bastion: Disabled
 - Azure Firewall: Disabled
 - Azure DDoS Network Protection: Disabled
- IP addresses:**
 - Address space:** 10.10.0.0/16 (65,536 addresses)
 - Subnet:** DataSubnet (10.10.1.0/24) (256 addresses)

Once the Deployment of both VNET is done, go under the VNets to check Subnets and confirm.



The screenshot shows the "Subnets" blade for the "Chaitra-VNET-Core" virtual network. It lists two subnets: "WebTier" and "MgmtSubnet", both configured with an IPv4 range of 192.168.10.0/24 and 192.168.20.0/24 respectively, and each providing 251 available IP addresses.

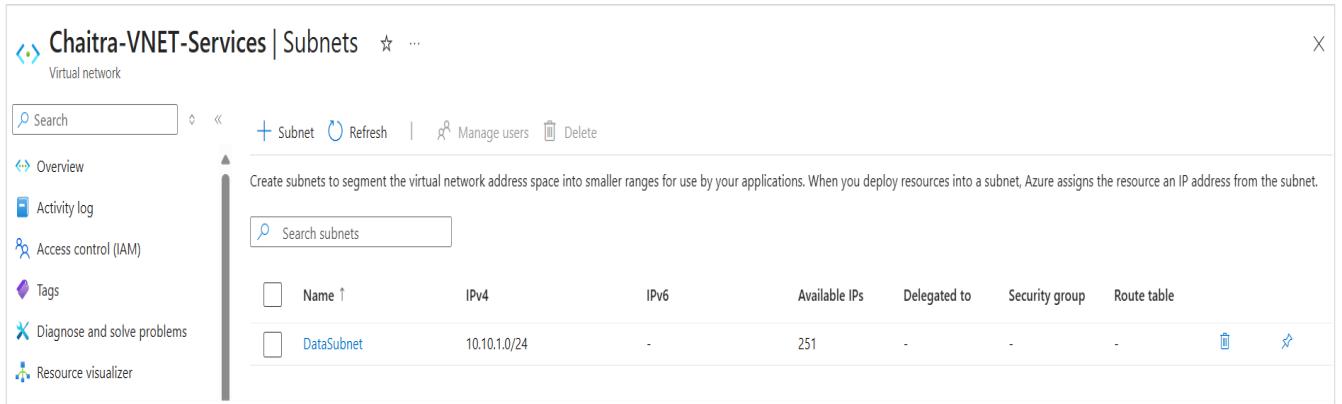
Name	IPv4	IPv6	Available IPs	Delegated to	Security group	Route table
WebTier	192.168.10.0/24	-	251	-	-	-
MgmtSubnet	192.168.20.0/24	-	251	-	-	-

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Chaitra-VNET-Services | Subnets

Virtual network

+ Subnet Refresh | Manage users Delete

Create subnets to segment the virtual network address space into smaller ranges for use by your applications. When you deploy resources into a subnet, Azure assigns the resource an IP address from the subnet.

Name ↑	IPv4	IPv6	Available IPs	Delegated to	Security group	Route table
DataSubnet	10.10.1.0/24	-	251	-	-	-

2 VNet Peering

To Establish bidirectional peering between the two VNets.

- We need to select any one Vnet that is created.
- Then select Peering option from the service menu.
- Click on Add to Peer a Vnet
- Here peering name is given as “VNETCore-VNETServices”

VNETCore-VNETService

Chaitra-VNET-Core

Virtual network peering enables you to seamlessly connect two or more virtual networks in Azure. This will allow resources in either virtual network to directly connect and communicate with resources in the peered virtual network.

Remote virtual network summary

Remote Vnet Id	/subscriptions/7a368cae-b6fe-4543-8fec-7358b1643da7/resourceGroups/C...
IP address space	10.10.0.0/16

Local virtual network summary

Peering link name *	VNETCore-VNETService
Peering state	Connected

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3 Creating VMs

- Create “Chaitra-MgmtVM” in MgmtSubnet:
- Selected Windows Server 2022,
- RDP access only from current public IP

Create a virtual machine ...

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

your resources.

Subscription * ⓘ Azure for Students

Resource group * ⓘ Chaitra_RG_Assignment

Create new

Instance details

Virtual machine name * ⓘ Chaitra-MgmtVM

Region * ⓘ (US) East US

Availability options ⓘ No infrastructure redundancy required

Security type ⓘ Trusted launch virtual machines

Configure security features

Image * ⓘ Windows Server 2022 Datacenter: Azure Edition - x64 Gen2

See all images | Configure VM generation

VM architecture ⓘ

Arm64

x64

Arm64 is not supported with the selected image.

- Click next for selecting mgmt-subnet and new public ip.

Network interface

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

Virtual network * ⓘ Chaitra-VNET-Core

Create new

Subnet * ⓘ MgmtSubnet (192.168.20.0/24)

Manage subnet configuration

Public IP ⓘ (new) Chaitra-MgmtVM-ip

Create new

NIC network security group ⓘ

None

Basic

Advanced

Public inbound ports * ⓘ

None

Allow selected ports

Select inbound ports *

RDP (3389)

⚠ This will allow all IP addresses to access your virtual machine. This is only recommended for testing. Use the Advanced controls in the Networking tab to create rules to limit inbound traffic to known IP addresses.

- Review and create.

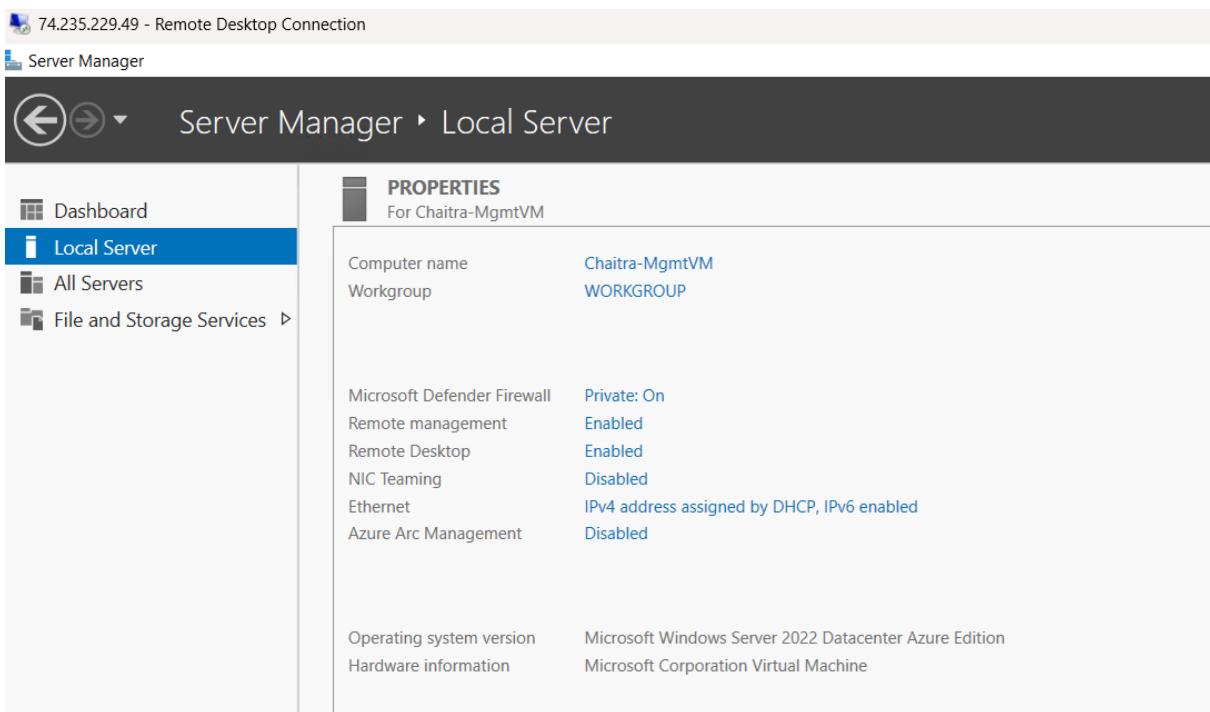
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Access the VM using Public ip via RDP



74.235.229.49 - Remote Desktop Connection

Server Manager

Server Manager ▸ Local Server

PROPERTIES
For Chaitra-MgmtVM

Computer name	Chaitra-MgmtVM
Workgroup	WORKGROUP
Microsoft Defender Firewall	Private: On
Remote management	Enabled
Remote Desktop	Enabled
NIC Teaming	Disabled
Ethernet	IPv4 address assigned by DHCP, IPv6 enabled
Azure Arc Management	Disabled
Operating system version	Microsoft Windows Server 2022 Datacenter Azure Edition
Hardware information	Microsoft Corporation Virtual Machine

Create second VM Ubuntu with NGINX, No ssh and allow Http and https

Network interface

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

Virtual network *	Chaitra-VNET-Core
	Create new
Subnet *	WebTier (192.168.10.0/24)
	Manage subnet configuration
Public IP	(new) Chaitra-WebVM-ip
	Create new
NIC network security group	<input type="radio"/> None <input checked="" type="radio"/> Basic <input type="radio"/> Advanced
Public inbound ports *	<input type="radio"/> None <input checked="" type="radio"/> Allow selected ports

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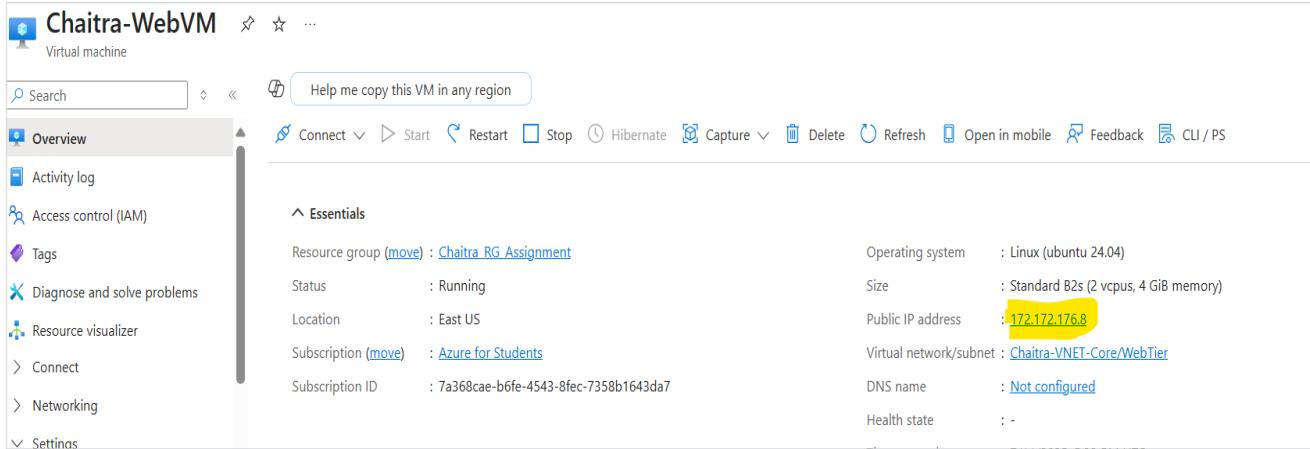
Date: 11-07-2025

Module Name: Fundamentals of Cloud Az-900

- Click next to select webtier subnet and create public ip
- Click on advanced tab to add Custom script data and review and create.
- Below is the script

```
#!/bin/bash
# Update package list
sudo apt update
# Install nginx
sudo apt install nginx -y
# Start nginx
sudo systemctl start nginx
```

After the deployment of Ubuntu vm, note the public ip of the VM to access the nginx default website via browser. (172.172.176.8)

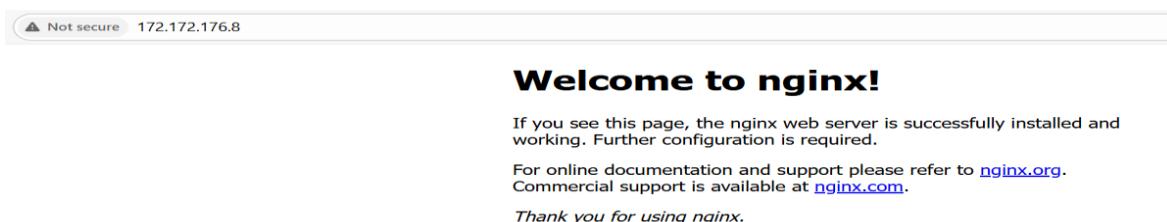


The screenshot shows the Azure portal interface for a virtual machine named "Chaitra-WebVM". The "Overview" tab is selected. On the left, there's a sidebar with options like Activity log, Access control (IAM), Tags, Diagnose and solve problems, Resource visualizer, Connect, Networking, and Settings. The main pane displays the following details:

Essentials	
Resource group (move)	: Chaitra_RG_Assignment
Status	: Running
Location	: East US
Subscription (move)	: Azure for Students
Subscription ID	: 7a368cae-b6fe-4543-8fec-7358b1643da7
Operating system	: Linux (ubuntu 24.04)
Size	: Standard B2s (2 vcpus, 4 GiB memory)
Public IP address	: 172.172.176.8 (highlighted in yellow)
Virtual network/subnet	: Chaitra-VNET-Core/WebTier
DNS name	: Not configured
Health state	: -

Go to NSG “chaitra-webvm-nsg” and add inbound security rules -> add ->allow http(80) and https(443)

Lets access the nginx default website from a browser via public ip. <172.172.176.8>



The screenshot shows a browser window with the URL "172.172.176.8". The page content is:

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.

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Create third VM(Ubuntu), without public ip

- In the networking tab, disable public ip and select the Vnet as Chaitra-VNET-Services and the subnet DataSubnet

Create a virtual machine ...

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

Basics Disks **Networking** Management Monitoring Advanced Tags Review + create

Define network connectivity for your virtual machine by configuring network interface card (NIC) settings. You can control ports, inbound and outbound connectivity with security group rules, or place behind an existing load balancing solution.
[Learn more](#)

Network interface

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

Virtual network * ⓘ Chaitra-VNET-Services
[Create new](#)

Subnet * ⓘ DataSubnet (10.10.1.0/24)
[Manage subnet configuration](#)

Public IP ⓘ None
[Create new](#)

NIC network security group ⓘ None
 Basic
 Advanced

- Review and create.

4 Creating NSG

Go to NSG settings of mgmtvm ->click inbound security rules ->add

Select source ip and enter public ip, select destination port as 3389(RDP) and ADD.

Chaitra-MgmtVM-nsg ⚙ ☆ ...

Network security group

Search Move Delete Refresh Give feedback

Overview

Activity log Access control (IAM) Tags Diagnose and solve problems Resource visualizer Settings Monitoring Automation Help

Resource group (move) : Chaitra RG Assignment Location : East US Custom security rules : 1 inbound, 0 outbound

Subscription (move) : Azure for Students Associated with : 0 subnets, 1 network interfaces

Subscription ID : 7a368cae-b6fe-4543-8fec-7358b1643da7

Tags (edit) : Add tags

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

Inbound Security Rules

Priority ↑	Name ↑	Port ↑	Protocol ↑	Source ↑	Destination ↑	Action ↑
310	AllowCidrBlockRDPInbou...	3389	TCP	74.235.229.49	Any	Allow
65000	AllowWnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerI...	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

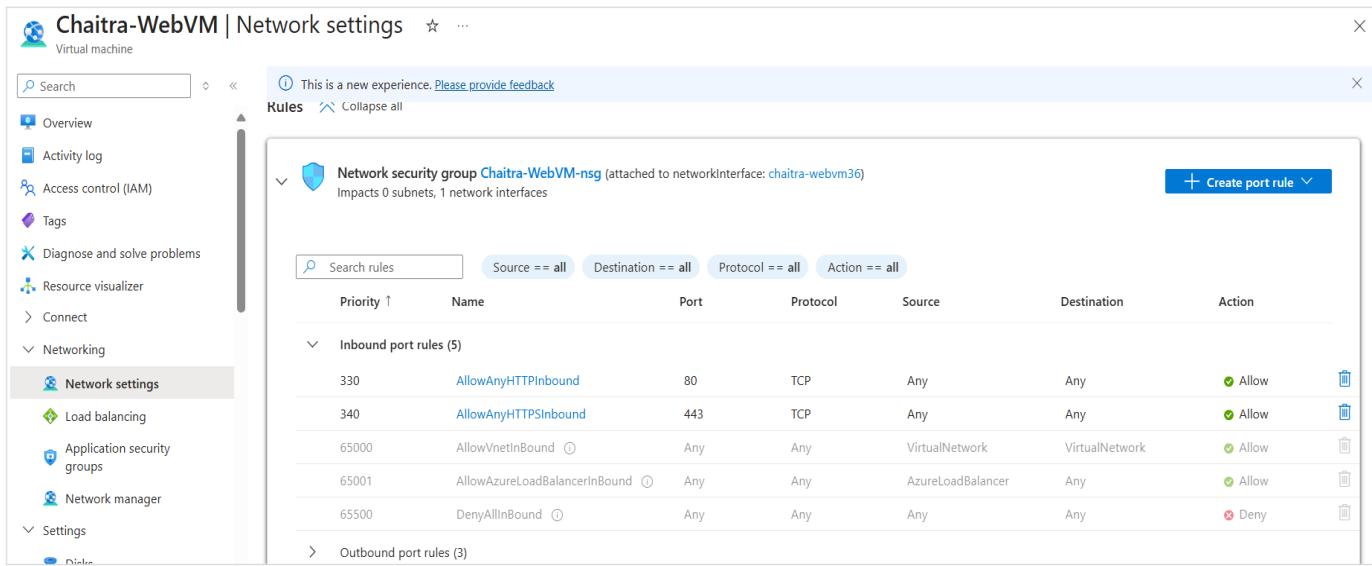
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Go to Ubuntu(nginx) NSG settings and allow only http and https



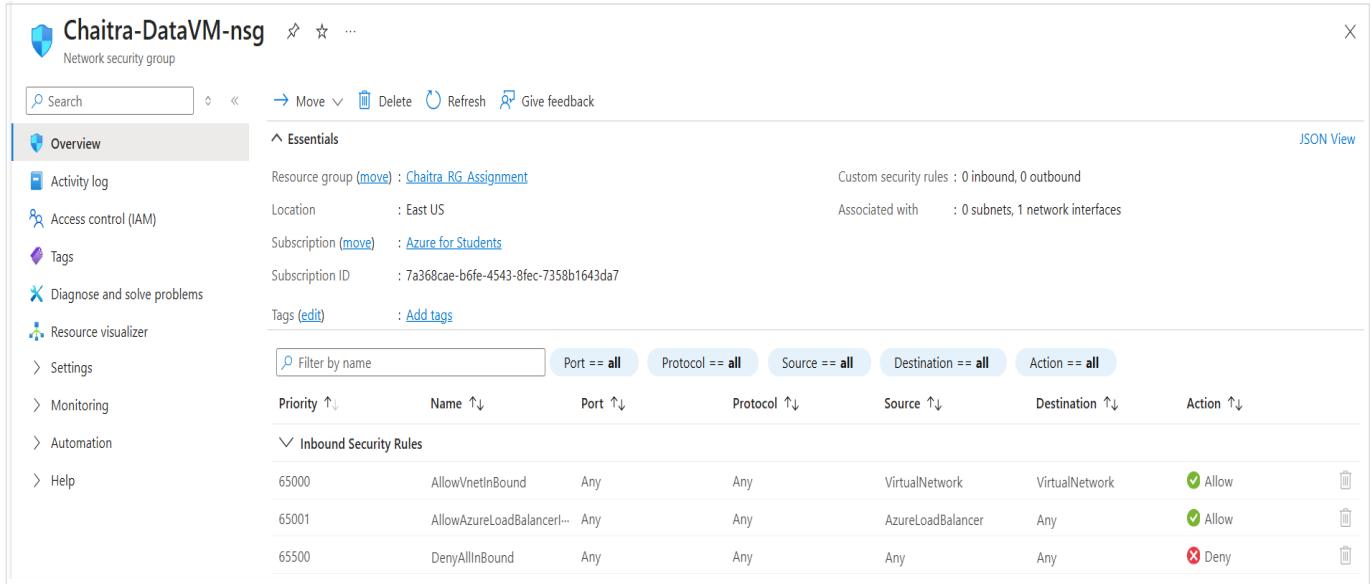
Chaitra-WebVM | Network settings

Rules + Create port rule

Network security group Chaitra-WebVM-nsg (attached to networkinterface: chaitra-webvm36)
Impacts 0 subnets, 1 network interfaces

Priority ↑	Name	Port	Protocol	Source	Destination	Action
330	AllowAnyHTTPInbound	80	TCP	Any	Any	Allow
340	AllowAnyHTTPSInbound	443	TCP	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

Data VM NSG settings



Chaitra-DataVM-nsg

Network security group

Overview

Resource group (move) : Chaitra RG Assignment

Location : East US

Subscription (move) : Azure for Students

Subscription ID : 7a368cae-b6fe-4f43-8fec-7358b1643da7

Tags (edit) : Add tags

Inbound Security Rules

Priority ↑	Name ↑↓	Port ↑↓	Protocol ↑↓	Source ↑↓	Destination ↑↓	Action ↑↓
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerIn... Any	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

Name: Chaitra N

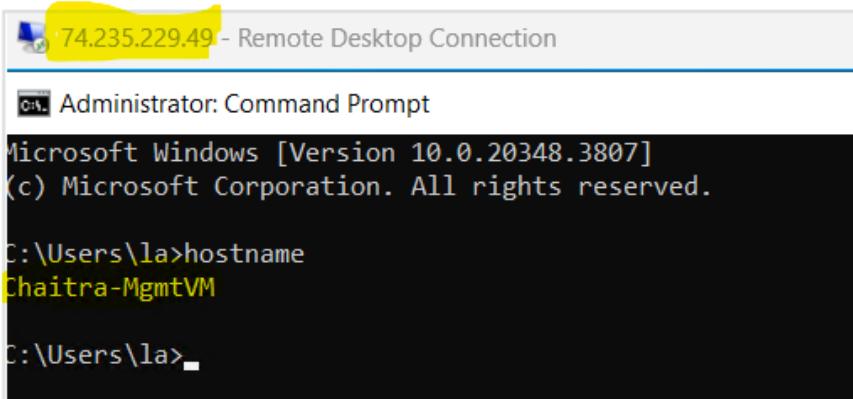
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FINAL OUTPUT

- Accessing Chaitra-MgmtVM via RDP by using public ip
- Enter Username and Password to login, login successful



```
74.235.229.49 - Remote Desktop Connection

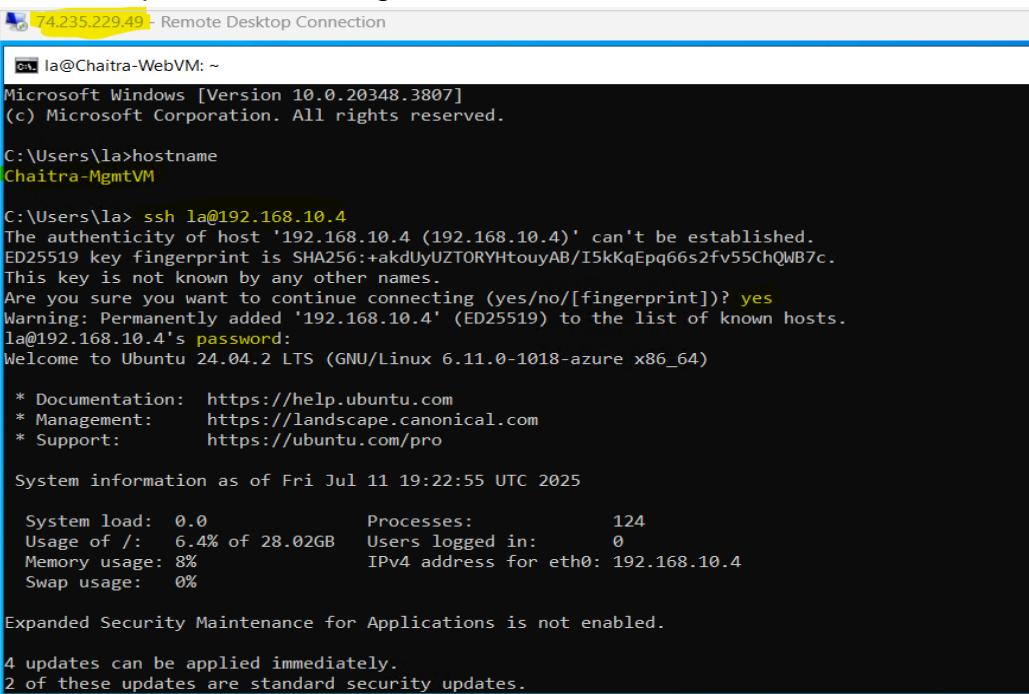
Administrator: Command Prompt

Microsoft Windows [Version 10.0.20348.3807]
(c) Microsoft Corporation. All rights reserved.

C:\Users\la>hostname
Chaitra-MgmtVM

C:\Users\la>
```

- SSH access to Chaitra-WebVM is performed internally from Chaitra-MgmtVM using the VM's private IP address (192.168.10.4). This confirms that internal connectivity is functioning correctly, while public SSH access remains restricted as per the configured NSG rules.
- Open Poweshell in MgmtVM RDP and Type the command `ssh la@192.168.10.4`, enter the password and login



```
74.235.229.49 - Remote Desktop Connection

la@Chaitra-WebVM: ~

Microsoft Windows [Version 10.0.20348.3807]
(c) Microsoft Corporation. All rights reserved.

C:\Users\la>hostname
Chaitra-MgmtVM

C:\Users\la> ssh la@192.168.10.4
The authenticity of host '192.168.10.4 (192.168.10.4)' can't be established.
ED25519 key fingerprint is SHA256:+akdUyUZTORYHtouyAB/I5kKqEpq66s2fv55ChQWB7c.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.10.4' (ED25519) to the list of known hosts.
la@192.168.10.4's password:
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.11.0-1018-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Fri Jul 11 19:22:55 UTC 2025

System load: 0.0          Processes:           124
Usage of /:  6.4% of 28.02GB   Users logged in:     0
Memory usage: 8%
Swap usage:  0%

Expanded Security Maintenance for Applications is not enabled.

4 updates can be applied immediately.
2 of these updates are standard security updates.
```

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- SSH access to Chaitra-DataVM is performed internally from Chaitra-WebVM using the VM's private IP address (192.168.10.4). This confirms that internal connectivity is functioning correctly via NSG rules.
- Enter the Username and Password for the VM and login

```
la@Chaitra-DataVM: ~
```

See "man sudo_root" for details.

```
la@Chaitra-WebVM:~$ ssh la@10.10.1.4
The authenticity of host '10.10.1.4 (10.10.1.4)' can't be established.
ED25519 key fingerprint is SHA256:CkDQMLWiKYhn/jXzm0jAwqkK9BFvjp+vnBol7Uom7yM.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.10.1.4' (ED25519) to the list of known hosts.
la@10.10.1.4's password:
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.11.0-1018-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro
```

- Accessed DataVM via private ip through SSH from the WebVM.

SSH access to **Chaitra-WebVM** was successfully tested from **Chaitra-MgmtVM** using its **private IP address**, confirming internal network connectivity. Since SSH access is **blocked via public IP** as per the NSG rules, this validates that access is only permitted through the internal VNet.

Additionally, connectivity from **Chaitra-WebVM** to **Chaitra-DataVM** using its **private IP** was successful, confirming that the Data VM is securely isolated from public networks and accessible only through internal tiers.