

Azure Fundamentals – AZ-900

– Project 2 Report

Title : - Azure Virtual Network and Bastion Host Deployment

Project Summary

This project involved deploying a secure and scalable cloud infrastructure using Microsoft Azure. The goal was to create a virtual network with isolated subnets, deploy virtual machines without public IPs, and enable secure access using Azure Bastion. The setup ensures internal communication between resources while maintaining strong perimeter security.

✂ Implementation Overview

1. Virtual Network Creation

- Created a new resource group: second-project
- Defined virtual network: vnet-1 in Central Asia (India) region
- Configured address space: 10.0.0.0/16
- Added subnet: subnet-1 with range 10.0.0.0/24

2. Azure Bastion Host Setup

- Enabled Azure Bastion during VNet creation.
- Created Bastion host: bastion
- Provisioned public IP: public-ip-bastion
- Dedicated subnet for Bastion ensured secure browser-based RDP/SSH access.

3. Virtual Machines Deployment

- Deployed two Ubuntu VMs: vm-1 and vm-2
- Placed both in subnet-1 without public IPs
- Configured authentication with username azureuser and password.
- Created and attached NSG: nsg-1 for traffic control

4. Secure Connectivity & Testing

- Connected to VMs using Bastion via Azure Portal
- Verified internal communication using ping between vm-1 and vm-2
- Successful ICMP replies confirmed private IP connectivity

Key Security Highlights

- No public IPs on VMs; Bastion provides secure access
- NSG applied to control inbound/outbound traffic
- Internal-only communication between VMs using private IPs

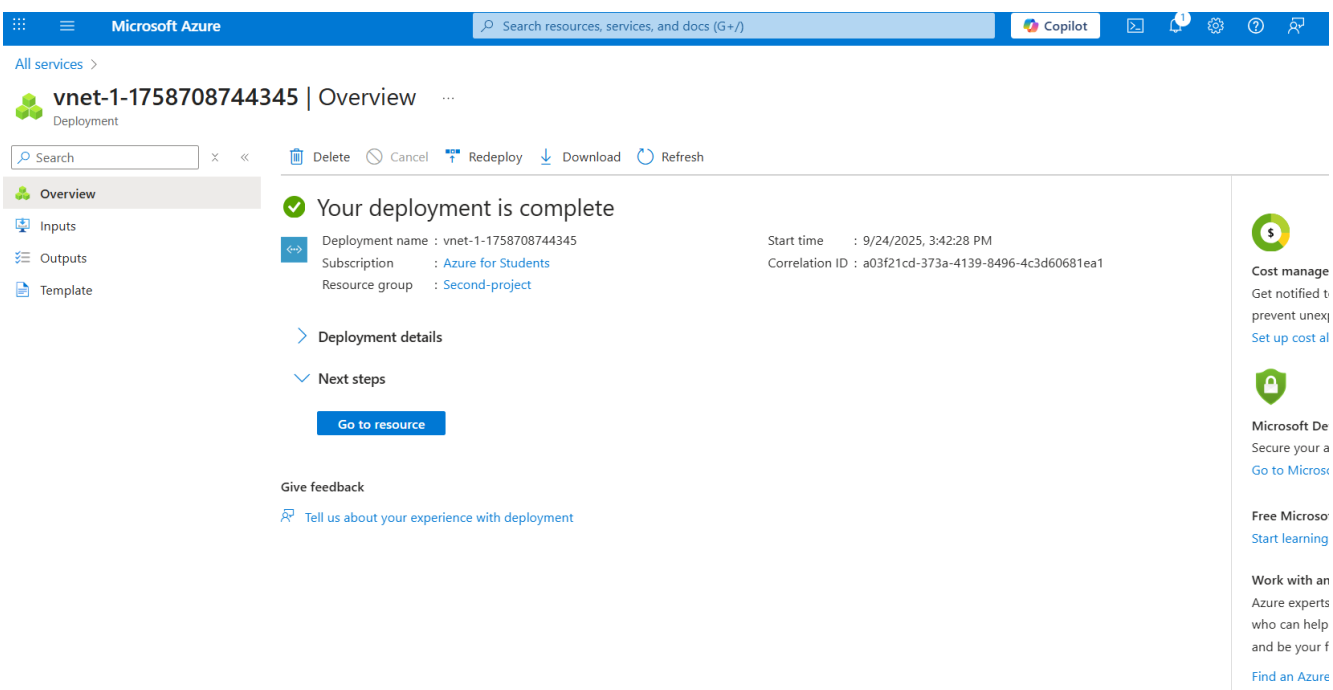
Outcome

- Successfully deployed a secure virtual network with Bastion access
- Demonstrated best practices in Azure networking and VM isolation
- Validated internal connectivity and Bastion-based remote access

Visual Results of outcome

❖ Virtual Network Creation

- Subnet configuration with subnet-1 and address range.



Microsoft Azure

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vnet-1-1758708744345 | Overview ...

Deployment

Search


Delete Cancel Redeploy Download Refresh

Overview

Inputs

Outputs

Template

 Your deployment is complete

Deployment name : vnet-1-1758708744345

Subscription : Azure for Students

Resource group : Second-project

Start time : 9/24/2025, 3:42:28 PM


Correlation ID : a03f21cd-373a-4139-8496-4c3d60681ea1


> Deployment details


< Next steps

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Fig 1:- Virtual Network configuration in Azure Portal

❖ Virtual Machine Deployment

- VM creation screen for vm-1 and vm-2.
- Networking tab showing selection of vnet-1, subnet-1, and NSG nsg-1.

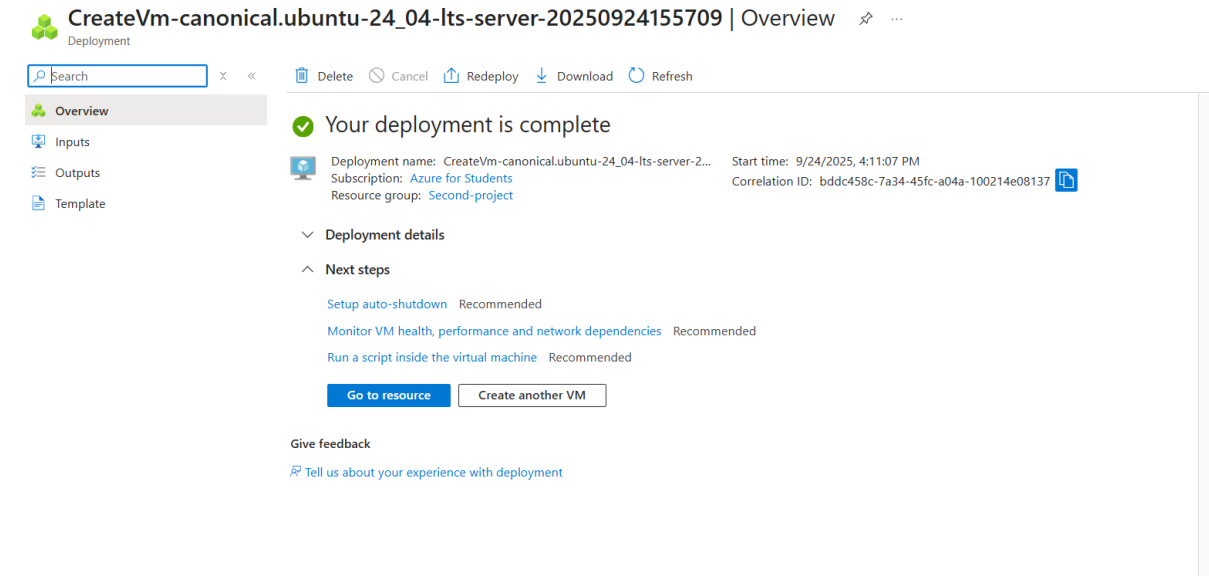


Fig2 :- VM-1

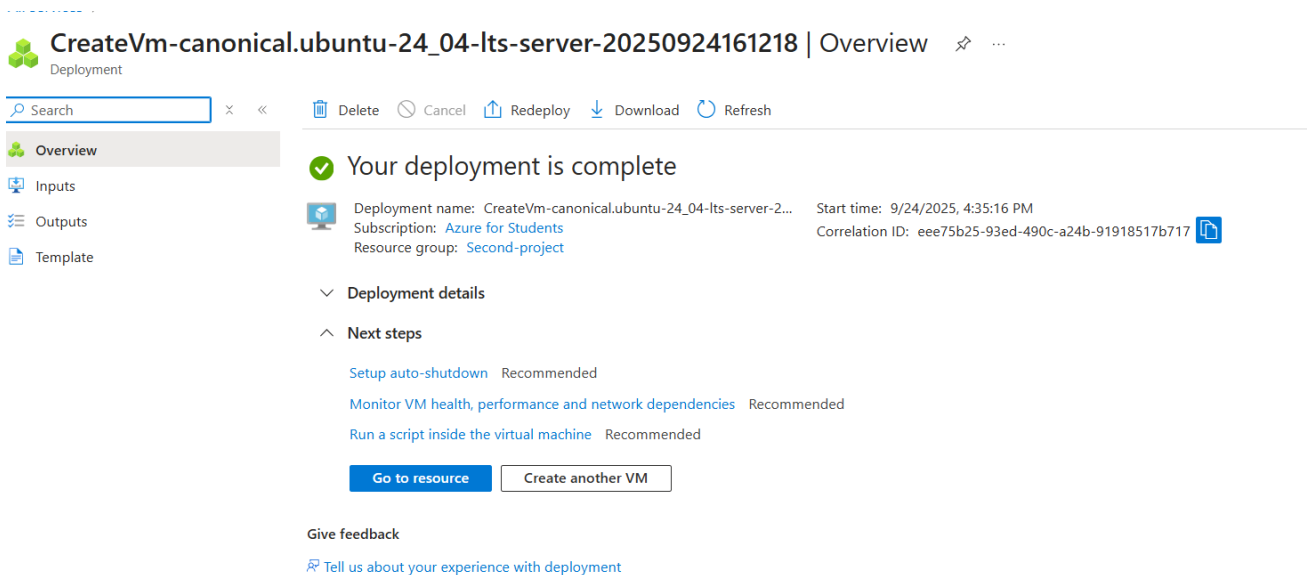


Fig3 :- VM-2

❖ Bastion Connection

- Bastion login screen with username/password prompt.

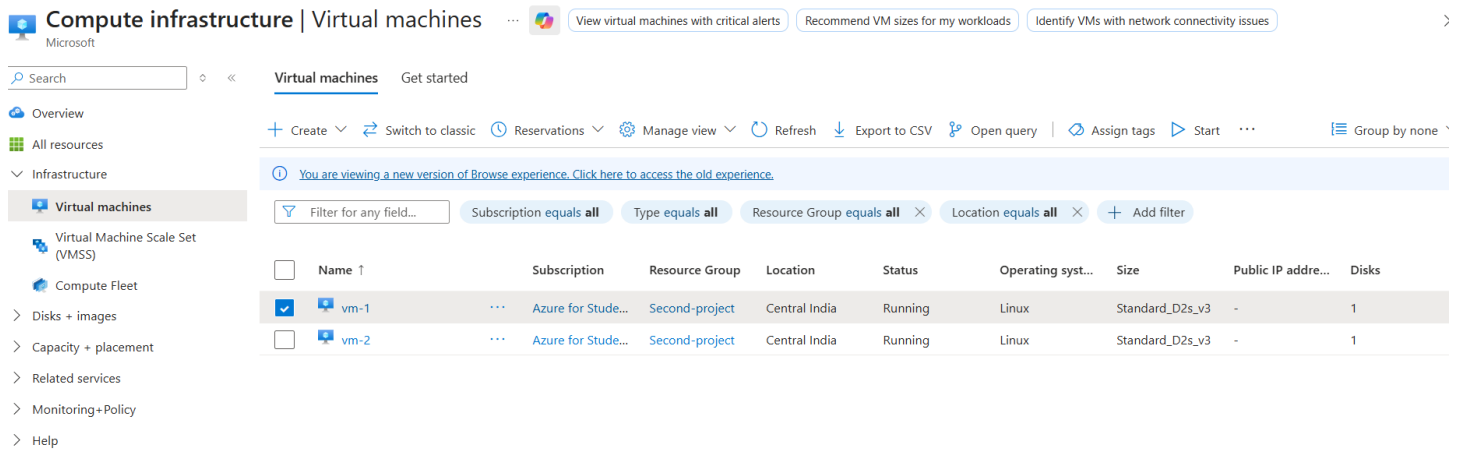


Fig 4:- Virtual Machines created

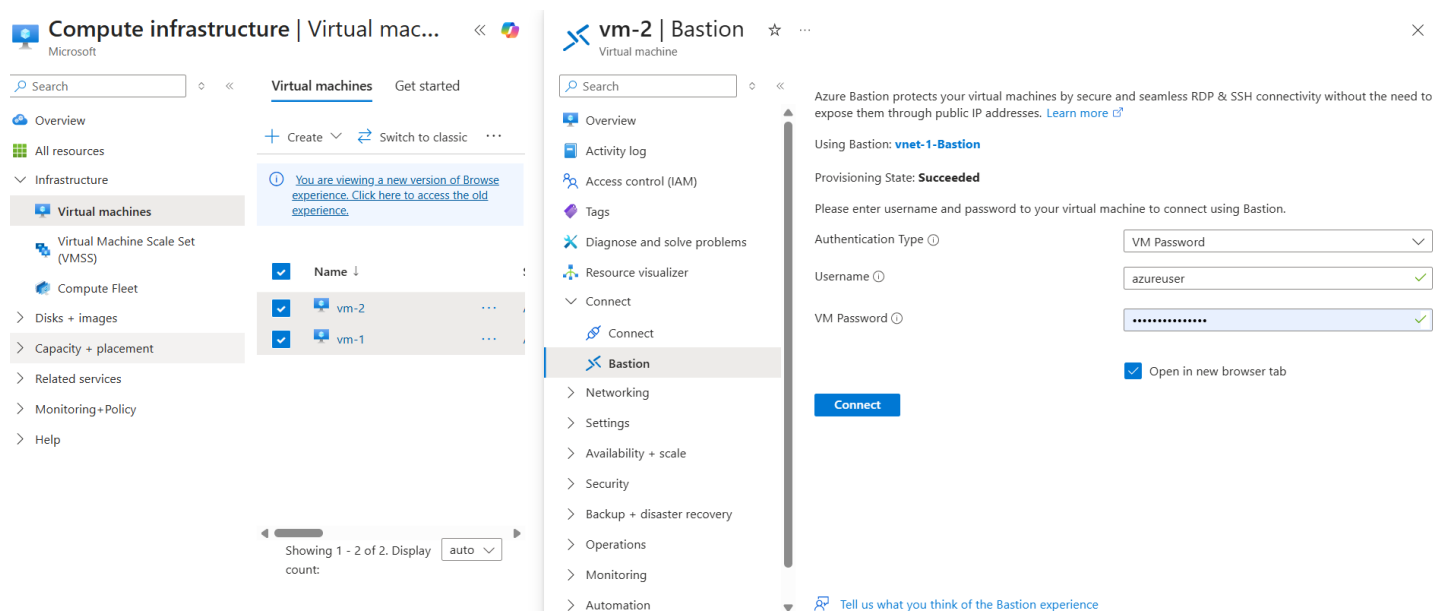
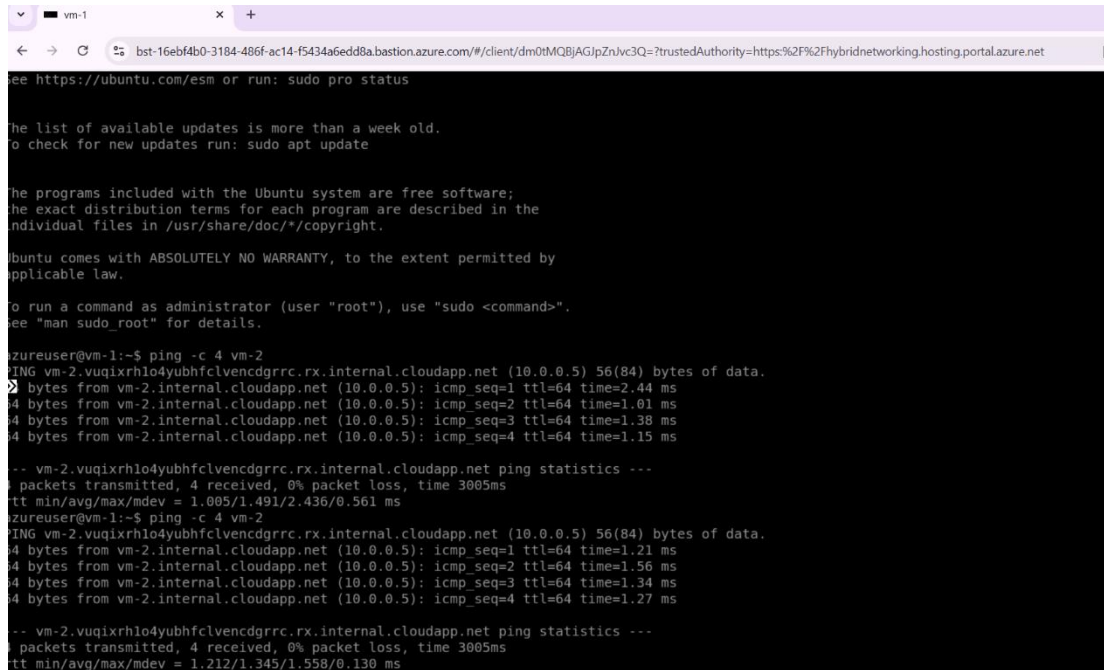


Fig5:- Bastion login screen with username/password

❖ Ping Results

- ping -c 4 vm-2 from vm-1.
- ping -c 4 vm-1 from vm-2.



```
vm-1
bst-16ebf4b0-3184-486f-ac14-f5434a6edd8a.bastion.azure.com/#/client/dm0tMQBJAGjPznJvc3Q=?trustedAuthority=https%2F%2Fhybridnetworking.hosting.portal.azure.net
see https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

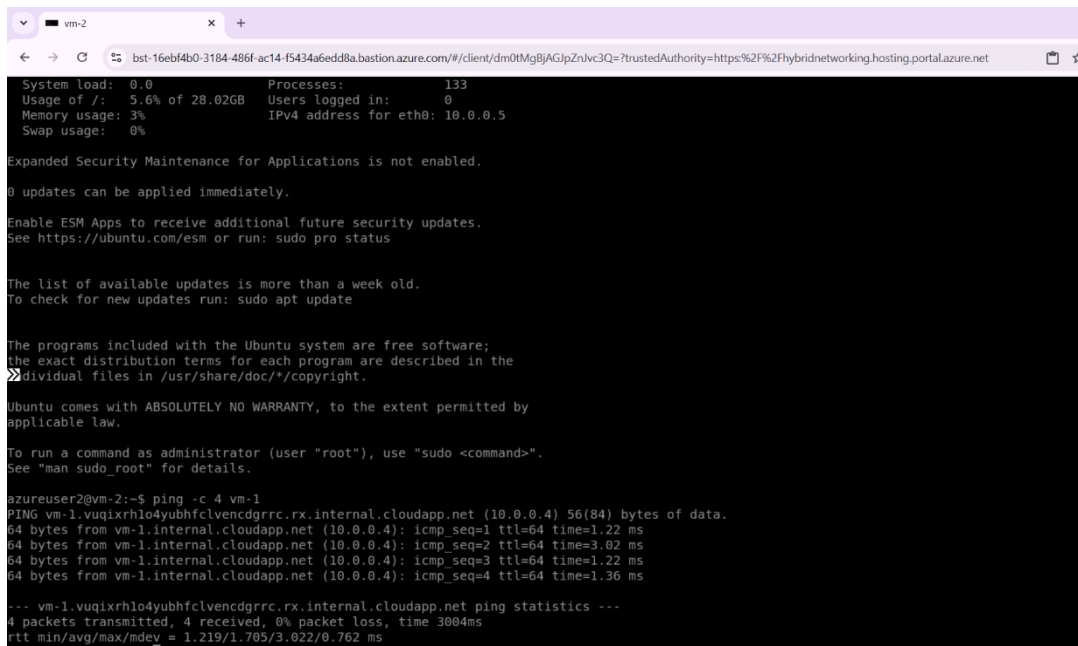
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

azureuser@vm-1:~$ ping -c 4 vm-2
PING vm-2.vuqixrh1o4yubhfc1vencdgrrc.rx.internal.cloudapp.net (10.0.0.5) 56(84) bytes of data.
64 bytes from vm-2.internal.cloudapp.net (10.0.0.5): icmp_seq=1 ttl=64 time=2.44 ms
64 bytes from vm-2.internal.cloudapp.net (10.0.0.5): icmp_seq=2 ttl=64 time=1.01 ms
64 bytes from vm-2.internal.cloudapp.net (10.0.0.5): icmp_seq=3 ttl=64 time=1.38 ms
64 bytes from vm-2.internal.cloudapp.net (10.0.0.5): icmp_seq=4 ttl=64 time=1.15 ms

-- vm-2.vuqixrh1o4yubhfc1vencdgrrc.rx.internal.cloudapp.net ping statistics --
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 1.005/1.491/2.436/0.561 ms
azureuser@vm-1:~$ ping -c 4 vm-2
PING vm-2.vuqixrh1o4yubhfc1vencdgrrc.rx.internal.cloudapp.net (10.0.0.5) 56(84) bytes of data.
64 bytes from vm-2.internal.cloudapp.net (10.0.0.5): icmp_seq=1 ttl=64 time=1.21 ms
64 bytes from vm-2.internal.cloudapp.net (10.0.0.5): icmp_seq=2 ttl=64 time=1.56 ms
64 bytes from vm-2.internal.cloudapp.net (10.0.0.5): icmp_seq=3 ttl=64 time=1.34 ms
64 bytes from vm-2.internal.cloudapp.net (10.0.0.5): icmp_seq=4 ttl=64 time=1.27 ms

-- vm-2.vuqixrh1o4yubhfc1vencdgrrc.rx.internal.cloudapp.net ping statistics --
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 1.212/1.345/1.558/0.130 ms
```

Fig6 :- Terminal output of ping -c 4 vm-2 from vm-1.



```
vm-2
bst-16ebf4b0-3184-486f-ac14-f5434a6edd8a.bastion.azure.com/#/client/dm0tMQBJAGjPznJvc3Q=?trustedAuthority=https%2F%2Fhybridnetworking.hosting.portal.azure.net
System load: 0.0 Processes: 133
Usage of /: 5.6% of 28.02GB Users logged in: 0
Memory usage: 3% IPv4 address for eth0: 10.0.0.5
Swap usage: 0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

azureuser2@vm-2:~$ ping -c 4 vm-1
PING vm-1.vuqixrh1o4yubhfc1vencdgrrc.rx.internal.cloudapp.net (10.0.0.4) 56(84) bytes of data.
64 bytes from vm-1.internal.cloudapp.net (10.0.0.4): icmp_seq=1 ttl=64 time=1.22 ms
64 bytes from vm-1.internal.cloudapp.net (10.0.0.4): icmp_seq=2 ttl=64 time=3.02 ms
64 bytes from vm-1.internal.cloudapp.net (10.0.0.4): icmp_seq=3 ttl=64 time=1.22 ms
64 bytes from vm-1.internal.cloudapp.net (10.0.0.4): icmp_seq=4 ttl=64 time=1.36 ms

-- vm-1.vuqixrh1o4yubhfc1vencdgrrc.rx.internal.cloudapp.net ping statistics --
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 1.219/1.705/3.022/0.762 ms
```

Fig7:-Terminal output of ping -c 4 vm-1 from vm-2.