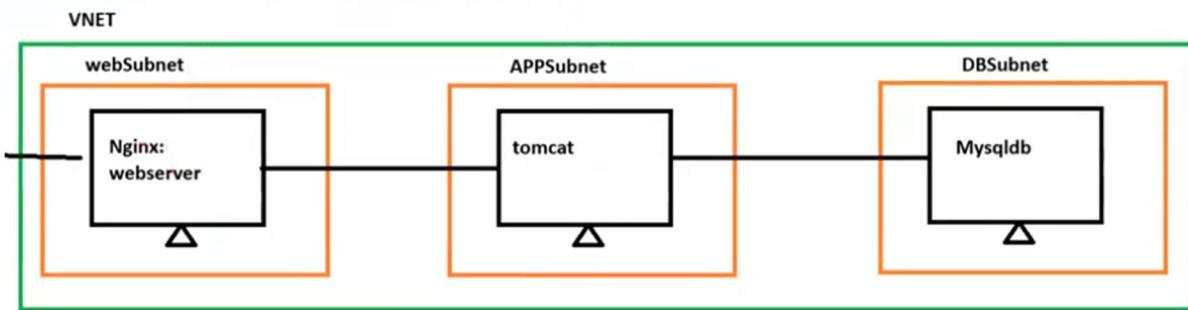


# Three Tier Architecture

- In the three architecture here we can connect web server to app server and app server to db server.
- It is mainly used for connecting the real world application.
- Here we can connect three machines.



- First we want to create a Resource Group.
- Then create a vnet in the vnet we can create two virtual machines.
- Creating a Virtual network.

Microsoft Azure

Create a virtual machine

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 \* (Sai-rg)

Region \* (Canada) Canada Central

Availability options \* (No infrastructure redundancy required)

Security type \* (Standard)

Image \* (Ubuntu Server 24.04 LTS - x64 Gen2 (free services eligible))

VM architecture (Arm64)

< Previous

Next : Disks >

Review + create

**Network interface**

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

Virtual network (New vnet-1 (Sal-rg))  
Edit virtual network

Subnet \* (New) Web-subnet  
Edit subnet 172.16.0.0 - 172.16.0.255 (256 addresses)

Public IP (new WebVm-ip)  
Create new  
Public IP addresses have a nominal charge. Estimate price

NIC network security group (None, Basic selected)  
Advanced

Public inbound ports \* (None, Allow selected ports selected)  
Select inbound ports \* SSH (22)

**Warning:** 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...

< Previous | Next : Management > | Review + create | Give feedback

→ Adding Virtual network name and ip address.

→ Creating two Subnets

→ One is Web Subnet

→ And is another Subnet is App Subnet

Name \* vnet-1

Define the address space of your virtual network with one or more IPv4 or IPv6 address ranges. 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. [Learn more](#)

+ Add a subnet

Subnets	IP address range	Size	NAT gateway
Web-subnet	172.16.0.0 - 172.16.0.255	/24 (256 addresses)	-
App-Subnet	172.16.1.0 - 172.16.1.255	/24 (256 addresses)	-

Add IPv4 address space |

Save | Cancel

Microsoft Azure | Upgrade | Search resources, services, and docs (G+/-) | Copilot | Home | Compute infrastructure | Virtual machines | Create a virtual machine | lsks2026@outlook.com | DEFAULT DIRECTORY (LSK2026...)

WebVm | Virtual machine | Help me copy this VM in any region | Manage this VM with Azure CLI | Overview

Overview | Connect | Start | Restart | Stop | Hibernate | Capture | Delete | Refresh | Open in mobile | Feedback | CLI / PS

Activity log | Access control (IAM) | Tags | Diagnose and solve problems | Resource visualizer | Connect | Networking | Settings | Availability + scale | Security | Backup + disaster recovery | Operations | Monitoring | Automation | Help

**Virtual machine**

- Computer name: WebVm
- Operating system: Linux (ubuntu 24.04)
- VM generation: V2
- VM architecture: x64
- Agent status: Ready
- Agent version: 2.15.0.1
- Hibernation: Disabled
- Host group: -
- Proximity placement group: -
- Colocation status: N/A
- Capacity reservation group: -
- Disk controller type: SCSI
- Azure Spot: Azure Spot -
- Azure Spot eviction policy: -

**Networking**

- Public IP address: 52.139.32.241 (Network interface webvm665)
- 1 associated public IPs
- Private IP address (IPv4): -
- Private IP address (IPv6): -
- Virtual network/subnet: vnet-1/Web-Subnet
- DNS name: Configure

**Size**

- Size: Standard D2s v5
- vCPUs: 2
- RAM: 4 GiB

**Source image details**

- Source image publisher: canonical
- Source image offer: ubuntu-24.04-lts
- Source image plan: server

## → Network Security Group for WebVm

The screenshot shows the Azure portal interface for a virtual machine named 'WebVm'. The left sidebar navigation is expanded, showing 'Compute infrastructure' > 'Virtual machines' > 'WebVm'. Under 'Network settings', the 'Network security group' section is selected. A table titled 'Inbound port rules (5)' lists five rules:

Priority	Name	Port	Protocol	Source	Destination	Action
300	SSH	22	TCP	Any	Any	Allow
320	HTTP	80	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

## → Installed nginx and browsing nginx on the browser



## → Creating an App Virtual machine.

The screenshot shows the 'Create a virtual machine' wizard in the Azure portal. The first step, 'Subscription' and 'Resource group', has been completed with 'Azure subscription 1' and 'Sai-rg' respectively. The 'Instance details' section is currently active, showing the following configuration:

- Virtual machine name \***: AppVm
- Region \***: (Canada) Canada Central
- Availability options**: No infrastructure redundancy required
- Security type**: Standard
- Image \***: Ubuntu Server 24.04 LTS - x64 Gen2 (free services eligible)
- VM architecture**: x64

At the bottom, there are navigation buttons: '< Previous', 'Next : Disks >', and 'Review + create'.

## → Selecting the virtual network and subnet already we have created for App VM

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

Create a virtual machine | Compute infrastructure | Virtual machines

Networking

Virtual network: vnet-1 (Sai-rg) | Edit virtual network

Subnet: App-subnet | Edit subnet | 172.16.0.0 - 172.16.0.255 (256 addresses)

Public IP: (new) AppVm-ip | Create new | Public IP addresses have a nominal charge. Estimate price

NIC network security group: Basic

Public inbound ports: Allow selected ports

< Previous | Next : Management | Review + create | Give feedback

→Created APP Virtual Machine.

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

AppVm | Virtual machine

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Resource visualizer

Connect | Start | Restart | Stop | Hibernate | Capture | Delete | Refresh | Open in mobile | Feedback | CLI / PS

Resource group: move | Status: Running | Location: Canada Central | Subscription: Azure subscription 1 | Tags: Add tags

Operating system: Linux (ubuntu 24.04) | Size: Standard D2s v2 (2 vcpus, 4 GiB memory) | Primary NIC public IP: 20.63.81.139 | 1 associated public IPs

Subscription ID: a3107e0d-376f-4650-b383-aa7b2b3c0c9a | DNS name: Not configured | Health state: - | Time created: 1/31/2026, 6:28 PM UTC

Properties | Monitoring | Capabilities (7) | Recommendations | Tutorials

**Virtual machine**

- Computer name: AppVm
- Operating system: Linux (ubuntu 24.04)
- VM generation: V2
- VM architecture: x64
- Agent status: Ready
- Agent version: 2.15.0.1

**Networking**

- Public IP address: 20.63.81.139 ( Network interface appvm959 ) | 1 associated public IPs
- Public IP address (IPv6): -
- Private IP address: 172.16.0.4
- Private IP address (IPv6): -
- Virtual network/subnet: vnet-1/App-subnet

→Installed Tomcat on the APP VM and browsing the public ip of AppVm.

Not secure http://20.63.81.139:8080

Apache Tomcat/11.0.18

If you're seeing this, you've successfully installed Tomcat. Congratulations!

Recommended Reading:

- Security Considerations How-To
- Manager Application How-To
- Clustering/Session Replication How-To

Developer Quick Start

- Tomcat Setup
- First Web Application
- Realms & AAA
- JDBC DataSources
- Examples
- Servlet Specifications
- Tomcat Versions

Find Help | Server Status | Manager App | Host Manager

## →Creating a Db 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**: Azure subscription 1

**Resource group**: Sai-rg

**Virtual machine name**: DbVm

**Region**: (Asia Pacific) Central India

**Availability options**: No infrastructure redundancy required

**Security type**: Standard

**Image**: Ubuntu Server 24.04 LTS - x64 Gen2 (free services eligible)

[See all images](#) | [Configure VM generation](#)

< Previous | Next: Disks > | Review + create | Give feedback

## →Creating a Vnet for Db.

→For free tier we can only create 4cpu's in single region that's why we create two Vm's in single region. Third Vm created in another region.

**Add a subnet**

Select an address space and configure your subnet. You can customize a default subnet or select from subnet templates if you plan to add select services later. [Learn more](#)

**Subnet purpose**: Default

**Name**: db-subnet

**IPv4**

Include an IPv4 address space

IPv4 address range: 172.17.0.0 - 172.17.255.255

Starting address \*: 172.17.0.0

Size: /16 (256 addresses)

Subnet address range: 172.17.0.0 - 172.17.0.255

**IPv6**

Include an IPv6 address space  This virtual network has no IPv6 address ranges.

**Private subnet**

Private subnets enhance security by not providing default outbound access. To enable outbound connectivity for virtual machines to access the internet, it is necessary to explicitly grant outbound access. A NAT gateway is the recommended way to provide outbound access.

Add | Cancel | Give feedback

**DbVm** Virtual machine

Help me copy this VM in any region | Manage this VM with Azure CLI

**Overview**

Resource group (move): Sai-rg

Status: Running

Location: Central India

Subscription (move): Azure subscription 1

Subscription ID: a3107e0d-376f-4650-b383-aa7b2b3c0c9a

Tags (edit) | Add tags

**Properties**

Computer name: DbVm

Operating system: Linux (ubuntu 24.04)

VM generation: V2

VM architecture: x64

Agent status: Ready

**Networking**

Public IP address: 52.140.120.34 (Network interface dbvm247)  
1 associated public IPs

Private IP address: 172.18.0.4

Virtual network/subnet: DbVnet/db-subnet

Operating system: 2.15.0.1

→ Installed mysql on DbVm.

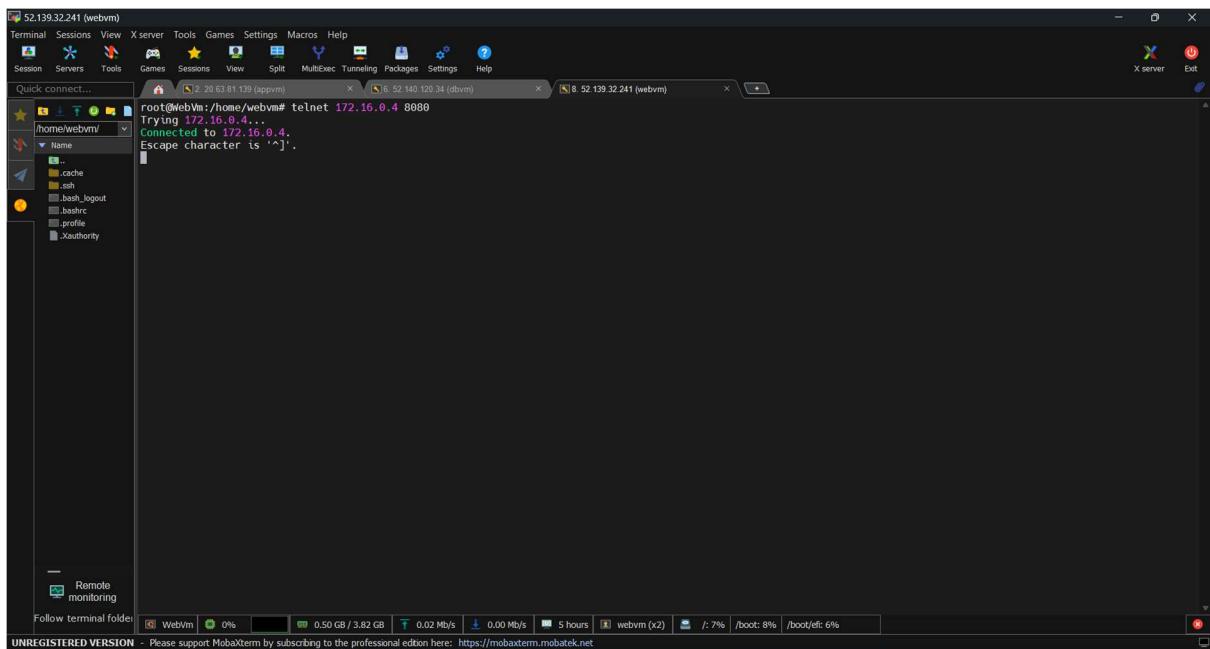
→ Changed the bind address to 0.0.0.0

```
root@DbVm:/home/dbvm# systemctl status mysql
● mysql.service - MySQL Community Server
   Loaded: loaded (/usr/lib/systemd/system/mysql.service; enabled; preset: enabled)
   Active: active (running) since Sat 2026-01-31 18:49:49 UTC; 2min 22s ago
     Process: 3238 ExecStartPre=/usr/share/mysql/mysql-systemd-start pre (code=exited, status=0/SUCCESS)
    Main PID: 3247 (mysqld)
      Status: "Server is operational"
        Tasks: 37 (limit: 4662)
       Memory: 368.2M (peak: 380.9M)
         CPU: 800ms
        CGroup: /system.slice/mysql.service
                  └─3247 /usr/sbin/mysqld

Jan 31 18:49:48 DbVm systemd[1]: Starting mysql.service - MySQL Community Server...
Jan 31 18:49:49 DbVm systemd[1]: Started mysql.service - MySQL Community Server.
root@DbVm:/home/dbvm#
```

→ Connection from Web server to App Server.

→ telnet <appvtip> 8080



→ Web server and app server both are in the same vnet that's why they can communicate.

→ But making the connection from app server to Db server both are in different regions and in different Virtual networks.

→ We want to make communication between two Vnets. First we did Vnet Peering then only we check the communication between app and Db.

→ Go to the Vnet and select peerings and click on add.

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes 'Microsoft Azure', 'Upgrade', 'Search resources, services, and docs (G+)', 'Copilot', and user information 'lskr2026@outlook.com'. The main content area is titled 'vnet-1 | Peering' and shows a table of peering connections. The table has columns: Name, Peering sync status, Peering state, Remote vnet, Virtual network, and Cross-tenant. One entry is listed: 'DbVnet-Vnet1' with 'Fully Synchronized' status and 'Connected' state. The left sidebar has sections like Resource visualizer, Settings, Address space, Connected devices, Subnets, Bastion, DDoS protection, Firewall, Microsoft Defender for Cloud, Network manager, DNS, Peerings (selected), Service endpoints, Private endpoints, Properties, and Locks.

→ Here I can open from vnet1 and make communication to DbVnet

→ Selecting Virtual network as DbVnet and finally click on add.

The screenshot shows the 'Add peering' dialog for 'vnet-1'. It includes fields for 'Peering link name' (set to 'Vnet1-Dbvnet'), 'Subscription' (set to 'Azure subscription 1'), and 'Virtual network' (set to 'DbVnet (Sai-rg)'). In the 'Remote virtual network peering settings' section, there are several checkboxes: 'Allow 'DbVnet' to access 'vnet-1'' (checked), 'Allow 'DbVnet' to receive forwarded traffic from 'vnet-1'', 'Allow gateway or route server in 'DbVnet' to forward traffic to 'vnet-1'', and 'Enable 'DbVnet' to use 'vnet-1's remote gateway or route server'. At the bottom are 'Add' and 'Cancel' buttons.

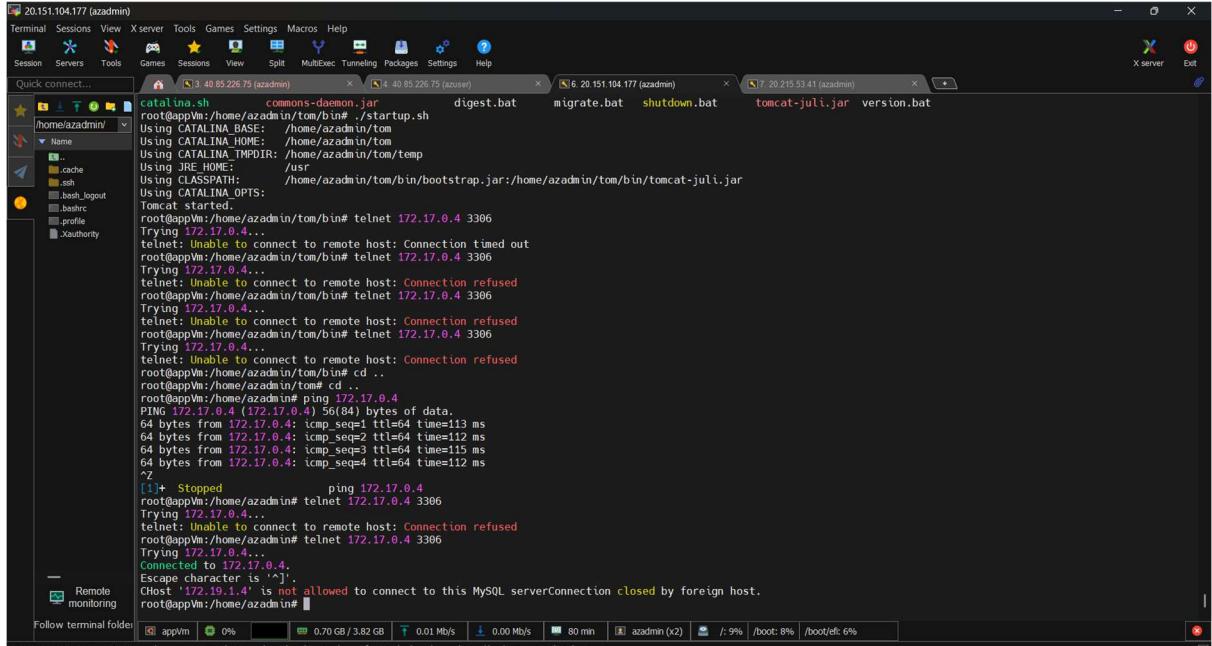
→ The peering can be done.

The screenshot shows the 'Peering' section for 'vnet-1' again. The table now lists two entries: 'DbVnet-Vnet1' and 'Vnet1-Dbvnet'. Both entries show 'Fully Synchronized' status and 'Connected' peering state. The left sidebar remains the same as in the previous screenshot.

→ Here we check the communication between the AppVnet and DbVnet.

→ Before that we check ping <dbpvt ip>.

→ If the peering has done the communication will work.



The screenshot shows a terminal window with four tabs open, each showing a different session. The sessions are:

- Session 1: 20.151.104.177 (azadmin) - This tab shows a command-line interface with several commands run, including catalina.sh, telnet, ping, and mysql commands.
- Session 2: 40.85.226.75 (azusee) - This tab is mostly blank or contains very faint text.
- Session 3: 20.151.104.177 (azadmin) - This tab shows a command-line interface with several commands run, including catalina.sh, telnet, ping, and mysql commands.
- Session 4: 20.215.53.41 (azadmin) - This tab is mostly blank or contains very faint text.

The main terminal area displays the command history from Session 1:

```
catalina.sh commons-daemon.jar digest.bat migrate.bat shutdown.bat tomcat-juli.jar version.bat
Tomcat started.
root@appVm:/home/azadmin/tom/bin# ./startup.sh
Using CATALINA_BASE: /home/azadmin/tom
Using CATALINA_HOME: /home/azadmin/tom
Using CATALINA_TMPDIR: /home/azadmin/tom/temp
Using JRE_HOME: /usr
Using CATALINA_OPTS: /home/azadmin/tom/bin/bootstrap.jar:/home/azadmin/tom/bin/tomcat-juli.jar
Using CATALINA_OPTS:
Tomcat started.
root@appVm:/home/azadmin/tom/bin# telnet 172.17.0.4 3306
Trying 172.17.0.4...
telnet: Unable to connect to remote host: Connection timed out
root@appVm:/home/azadmin/tom/bin# telnet 172.17.0.4 3306
Trying 172.17.0.4...
telnet: Unable to connect to remote host: Connection refused
root@appVm:/home/azadmin/tom/bin# telnet 172.17.0.4 3306
Trying 172.17.0.4...
telnet: Unable to connect to remote host: Connection refused
root@appVm:/home/azadmin/tom/bin# cd ..
root@appVm:/home/azadmin/tom# cd ..
root@appVm:/home/azadmin# ping 172.17.0.4
PING 172.17.0.4 (172.17.0.4) 56(84) bytes of data.
64 bytes from 172.17.0.4: icmp_seq=1 ttl=64 time=113 ms
64 bytes from 172.17.0.4: icmp_seq=2 ttl=64 time=112 ms
64 bytes from 172.17.0.4: icmp_seq=3 ttl=64 time=115 ms
64 bytes from 172.17.0.4: icmp_seq=4 ttl=64 time=112 ms
^Z
[1]+ Stopped                  ping 172.17.0.4
root@appVm:/home/azadmin# telnet 172.17.0.4 3306
Trying 172.17.0.4...
telnet: Unable to connect to remote host: Connection refused
root@appVm:/home/azadmin# telnet 172.17.0.4 3306
Trying 172.17.0.4...
Connected to 172.17.0.4.
Escape character is ']'.
Host '172.19.1.4' is not allowed to connect to this MySQL serverConnection closed by foreign host.
root@appVm:/home/azadmin#
```

At the bottom of the terminal window, there is a status bar showing system information:

- Follow terminal folder
- appVm
- 0%
- 0.70 GB / 3.82 GB
- 0.01 Mb/s
- 0.00 Mb/s
- 80 min
- azadmin (x2)
- /: 9%
- /boot: 8%
- /boot/efi: 6%