

Whenever we want to do any update on server , we take image of server for backup purpose :
We can create vm from image . When we capture image of vm , vm will be in stop state .

Once capture done , image will be present in services -> images – we can also create vm from image .

The screenshot shows the Azure portal interface for a virtual machine named 'new'. The left sidebar contains navigation options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings, Networking, Connect, Disks, Size, Microsoft Defender for Cloud, Advisor recommendations, Extensions + applications, Availability + scaling, and Configuration. The main area displays the VM's status as 'Running' and provides various configuration details.

Essentials	
Resource group (move)	: user-zdkxlyjnhhi
Status	: Running
Location	: East US
Subscription (move)	: cloudlabs36
Subscription ID	: 2a42e097-acef-4ed7-9d6c-6800e9cc4227
Tags (edit)	: Click here to add tags

Properties	
Computer name	: new
Operating system	: Linux
Publisher	: canonical

Networking	
Public IP address	: 172.190.39.244 (Network interface r
Public IP address (IPv6)	: -
Private IP address	: 10.0.0.4

Additional details shown: Operating system : Linux, Size : Standard DS1 v2 (1 vcpu, 3.5 GiB memory), Virtual network/subnet : new-vnet/default, DNS name : Not configured, Health state : -.

We can capture image of vm , and save it .

We can select whether we want to delete vm after creating image or not while we capture image .

When we capture image , it will stop running vm and then image will be captured .

The screenshot shows the 'Create an image' wizard in the Azure portal. The wizard is at the 'Validation passed' step, showing configuration details for the image creation. A notification on the right indicates that the deployment was successful.

Create an image

Validation passed

Region	: East US
Share image to Azure compute gallery	: Yes
Automatically delete this virtual machine after creating the image	: No
Azure compute gallery	: (new) new
Operating system state	: Generalized
Target VM image definition	: (new) new
Version number	: 0.0.1
Source virtual machine	: new
Exclude from latest	: No
End of life date	: None
Shallow replication	: No

Replication

Default replica count	: 1
Replication	: East US: 1

Tags

(none)

Notifications

More events in the activity log → Dismiss all ×

*** Stopping virtual machine Running ×

Stopping virtual machine '/subscriptions/2a42e097-acef-4ed7-9d6c-6800e9cc4227/resourceGroups/user-zdkxlyjnhhi/providers/Microsoft.Compute/VirtualMachines/new...' a few seconds ago

✓ Deployment succeeded ×

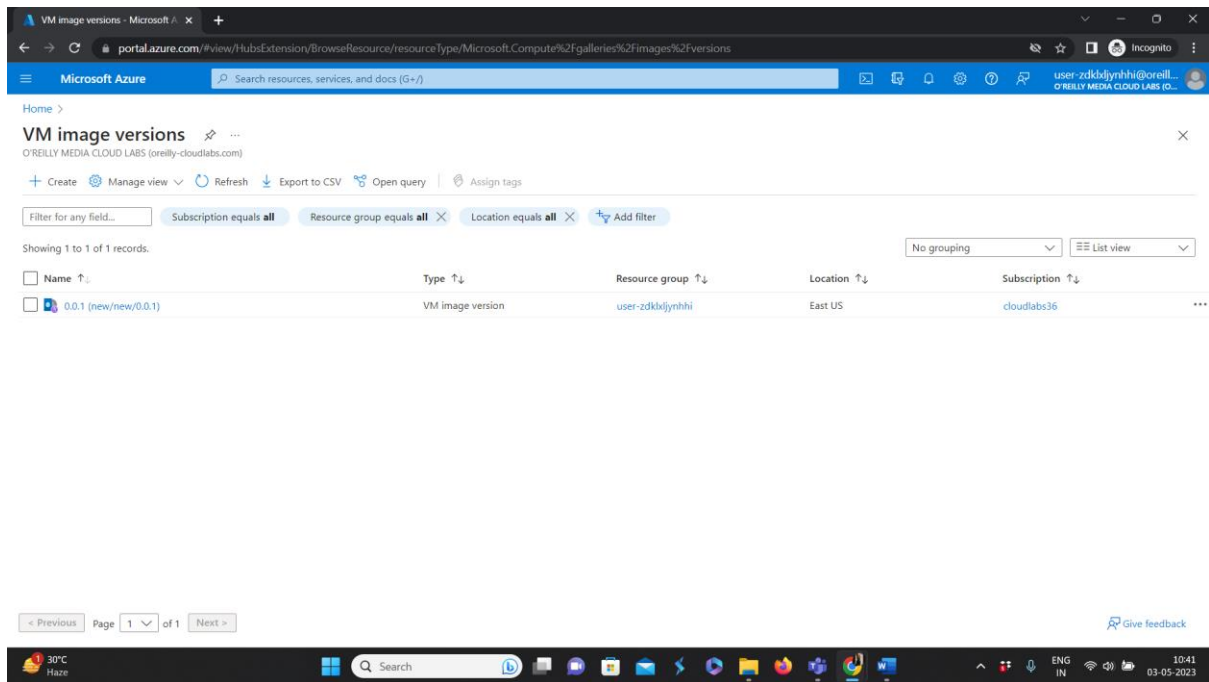
Deployment 'CreateVm-canonical.0001-com-ubuntu-server-focal-2-20230503101638' to resource group 'user-zdkxlyjnhhi' was successful.

[Go to resource](#) [Pin to dashboard](#)

5 minutes ago

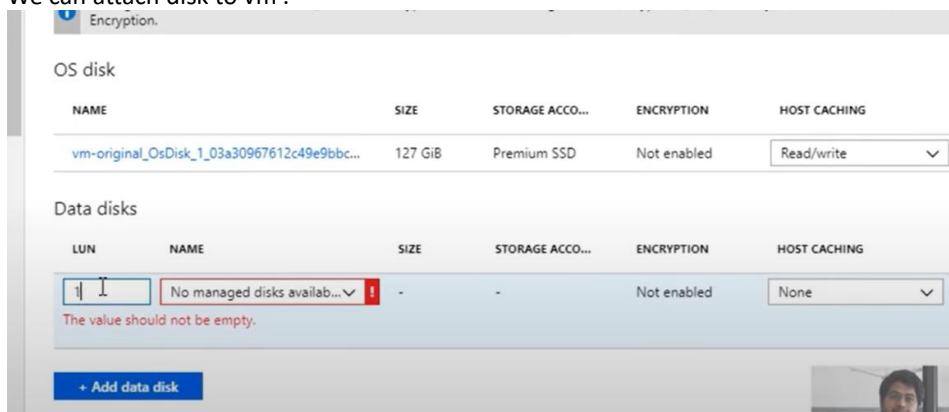
We can view images in IMAGES .

We can create vm using image .

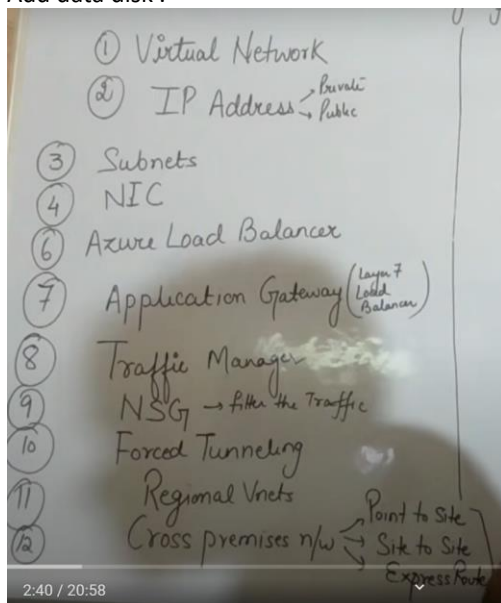


How to attach extra disk to vm ?

We can attach disk to vm .



Add data disk .



When 2 vm are in same vnet then they can communicate with private ip , for 2 vms in different vnet we need to do peerinf between them so that they can communicate . first 4 ip address and last 1 address of address range are reserved .

Eg for address range 10.0.0.0/24 ,

10.0.0.0 - this ip is reserved for network

10.0.0.1 – reserved for default gateway

10.0.0.2 10.0.0.3 – reserved for dns

10.0.0.255 – reserved for broadcast .

Subnets – ek bade network ko chote pieces me divide krna .

Address range 10.0.0.0/8 – it means start ke 8 bit network k lie reserved hai .

Subnet for above address range :

10.0.0.0/16 , 10.1.0.0/16 , 10.2.0.0/16

NIC – network interface card – it will be created by default , network ko internet se connect krna – nic nhi h to vm se internet p ni connect kr sqte ,

Azure load balancer – traffic ko distribute krta ,

Application gateway – layer 7 load balancer –

Traffic manager – jb hum globally site chla te to usme kse manage krna h , us k traffic us server p route krna , india ka traffic india server p route krna ,

NSG – filter the traffic – jb hum network create krte – tb inbound and outbound traffic add kr sqte –

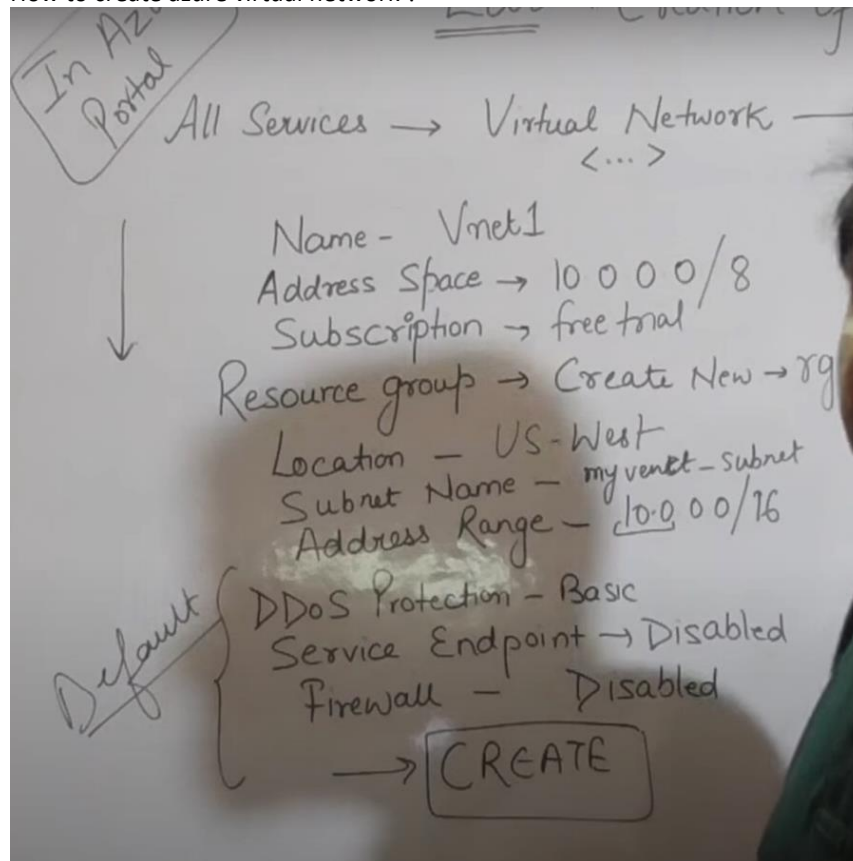
Forced tunnelling – we define route for our traffic . user defined route .

Regional vnets – ek vm us m hai n ek vm south india m h to dono communicate kr sqte private ip se

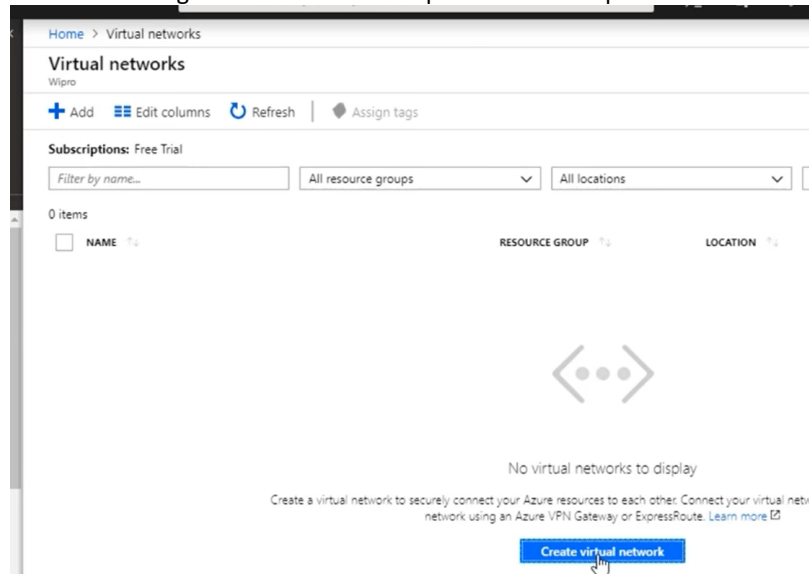
Cross premise network – site to site , point to site , expressroute : vpn – ek vpn outside azure ko azure se connect krna h to – personal vpn ko azure k vpn se connect krna pdega – site to site connection ,

There are 54 regions in azure ,

How to create azure virtual network ?



For address range of subnet we take a part of address space which is used for vnet .



We can create vnet .

Same vnet m vms hai to they can communicate with each other via ping ssh .

2 vm ek us m and india m hai in different vnet – they can also communicate with private ip – microsoft backbone is used for this ,

Data is not encrypted when vms communicate with private ip but it is secure , If we want we can add encryption ,

Vnet to vnet peering in same region :

2 different vnet m peering kse krte ?

Azure supports 2 type of peering :

Vnet peering : connecting vnet in same azure region

Global vnet peering: connecting vnet across azure region .

Benefits :

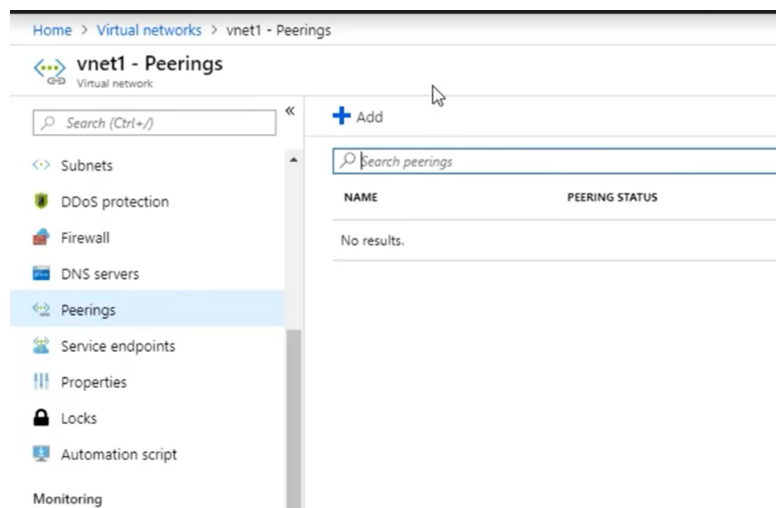
Network traffic between peered virtual network is private

Low latency high bandwidth connection

Ability to communicate , transfer data across azure regions subscription

Traffic between virtual machine is peered virtual network is routed directly through Microsoft backbone infrastructure , not through gateway or over public internet ,

Peering are transitive ,



Add peering

Home > Virtual networks > vnet1 - Peerings > Add peering

Add peering

vnet1

* Name
vnet1-vnet2 ✓

Peer details

Virtual network deployment model ⓘ
☒ Resource manager ☐ Classic

☐ I know my resource ID ⓘ

* Subscription ⓘ
Free Trial

* Virtual network
vnet2 (rg-peering)

Configuration

Allow virtual network access ⓘ
☒ Disabled ☒ Enabled

☐ Allow forwarded traffic ⓘ

☐ Allow gateway transit ⓘ

OK

We have to do peering between both vnets .

Home > Virtual networks > vnet2 - Peerings > Add peering

Add peering

vnet2

* Name
vnet2-vnet1 ✓

Peer details

Virtual network deployment model ⓘ
☒ Resource manager ☐ Classic

☐ I know my resource ID ⓘ

* Subscription ⓘ
Free Trial

* Virtual network
vnet1 (rg-peering) ^

Southeast Asia

vnet1 (rg-peering)

Cannot be peered with this virtual network

vnet2 (rg-peering)

☐ Allow forwarded traffic ⓘ

☐ Allow gateway transit ⓘ

OK

Search peerings

NAME	PEERING STATUS	PEER	GATEWAY TRANSIT
vnet1-vnet2	Connected	vnet2	Disabled

We can check peering status , now vm with vnets in same regions can communicate since peering is done between instances ,

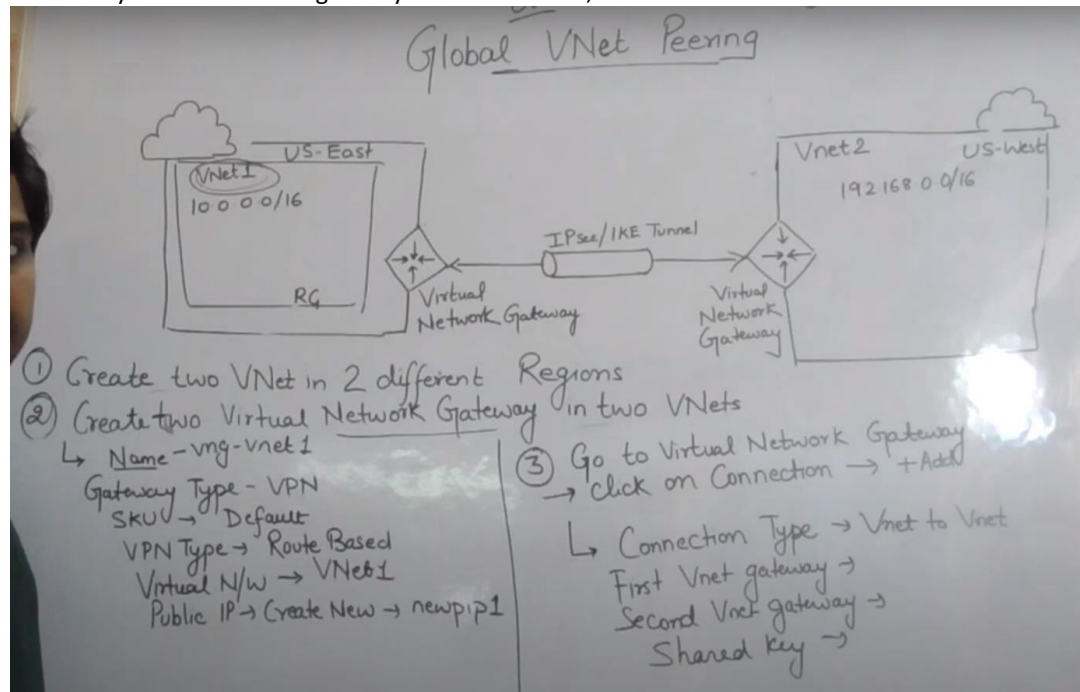
Global vnet peering : vms can communicate in different vnet in different region .

By default data is not encrypted ,

When vnet are in different region , we have to create virtual network gateway at boundary of both vnet and will establish connection between both gateway ,

Create network gateway in both vnets ,

Shared key of both network gateway should be same ,



Create 2 vnet in different regions , create vm in both vnet .

The image shows two overlapping screenshots of the Microsoft Azure portal's 'Create virtual network' interface. The background window shows the configuration for a new VNet in the 'East US' region, with a name of '(New) rg-vnet', a subnet named 'east-subnet' with address range '10.0.1.0/24', and DDoS protection set to 'Basic'. The foreground window shows the configuration for a VNet in the 'West US' region, with a name of 'rg-vnet', a subnet named 'west-subnet' with address range '192.168.1.0/24', and DDoS protection set to 'Basic'. Both windows show options for 'Service endpoints' and 'Firewall'.

Create network gateway for both vnet :

The screenshot shows the 'Create virtual network gateway' form. The 'Name' field is filled with 'westmg'. The 'Gateway type' is set to 'VPN'. The 'VPN type' is set to 'Route-based'. The 'SKU' is set to 'VpnGw1'. The 'Virtual network' dropdown is open, showing 'Choose a virtual network'. The 'Public IP address' is set to 'Create new'. The 'Create' button is at the bottom left.

Once vnet gateway create for both vnet – we can establish connection between both .

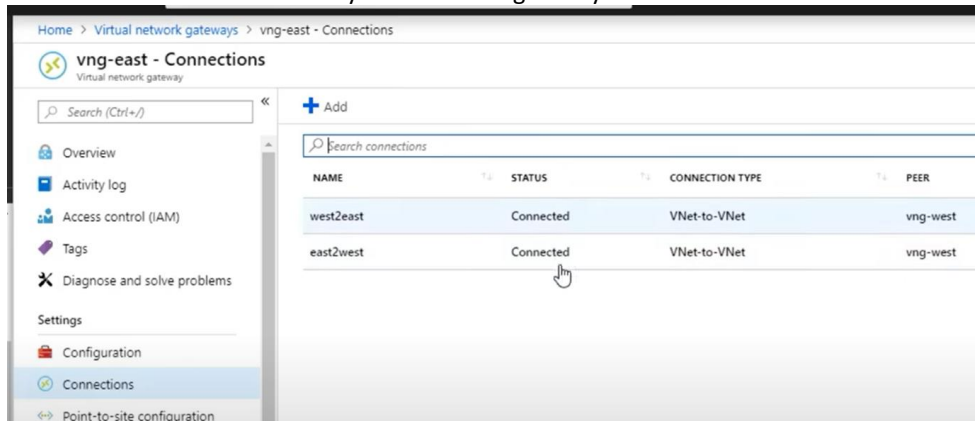
The screenshot shows the 'vng-east - Connections' page in the Azure portal. The left sidebar shows the 'Connections' tab selected. The main area shows a search bar and a table with columns 'NAME' and 'STATUS'. The table is empty, showing 'No results'. The 'Add' button is at the top right.

Add connection in both gateway

The first screenshot shows the 'Add connection' form for 'vng-east'. The 'Name' is 'east2west', 'Connection type' is 'VNet-to-VNet', 'First virtual network gateway' is 'vng-east', and 'Second virtual network gateway' is 'vng-west'. The 'Shared key (PSK)' is 'Test1'. The 'Subscription' is 'Free Trial'.

The second screenshot shows the 'Add connection' form for 'vng-west'. The 'Name' is 'west2east', 'Connection type' is 'VNet-to-VNet', 'First virtual network gateway' is 'vng-west', and 'Second virtual network gateway' is 'vng-east'. The 'Shared key (PSK)' is 'Test1'. The 'Subscription' is 'Free Trial'. A tooltip explains: 'A mixture of letters and numbers, used to establish encryption for the connection. The same shared key must be used in both the virtual network and local network gateways. If your gateway device doesn't provide one, you can make one up here and provide it to your device.'

We have to use same shared key for both vnet gateway .



Status of connections should be connected . now vms in the 2 vnet can communicate for which vnet gateway connection is created .

Azure load balancer :

With azure load balancer you can scale your application and create high availability for your services .

Public lb network k bahar lgta ,

we can use Azure Load Balancer to :-

- ① Load Balance incoming internet traffic to your VMs. This is known as Public Load Balancer.
- ② Load Balance Traffic across VMs inside a Virtual network. This is known as Internal Load Balancer.
- ③ Port forward traffic to a specific port on specific VM.
- ④ Provide Outbound Connectivity for VMs inside your Virtual network by Using a Public Load Balancer.

Fundamental Load Balancer features -

Load Balancer Uses a hash-based algorithm for distribution of inbound flows and rewrites the headers of flows to backend pool instances accordingly.

By default, Load Balancer, Uses a 5-tuple hash Composed of Source IP-address, Source port, destination IP, destination port & IP Protocol no. to map flows to available Server.

5 Tuple hash

- Source IP
- Source port
- Destination IP
- Destination Port
- IP Protocol.

Standard and basic lb :

Azure Load Balancer		
Load Balancer Supports both Basic and Standard SKU → Stock Keeping Unit		
	Standard SKU	Basic SKU
Backend Pool Size	Support upto 1000 instances	Support upto 100 instances
Backend Pool endpoint	Any Virtual Machine in a Single Virtual network, including blend of Virtual Machine Availability Set, Virtual Machine Scale Set.	Virtual Machine in a Single Availability Set or Virtual Machine Scale Set.
Health Probe	TCP, HTTP, HTTPS	TCP, HTTP
Health Probe timeout	TCP Connections stay Alive on instance probe down and on all Probe Down	TCP Connections stay alive on instance probe down. All TCP Connection Terminate on all probes are down.
Zone Redundant, Cross Zone load Balancing	Yes	Not Available
Provisioning time	Most operations < 30 Seconds	60 - 90+ Seconds typically
Cost	Charged Based on number of Rules, data processed inbound and Outbound associated with Resources	No charge

How to deploy public load balancer ?

Public Load Balancer

When Internet Client send webpage Request to the Public IP address of a Webapp on TCP Port 80, Azure Load Balancer distributes the Request across the three VM in the load Balanced Set.

By default, Azure Load Balancer, distributes network Traffic equally among multiple VM instances.

Steps for Lab

1. Create two Virtual Machine → Webserver1, Webserver2
 * Availability Set → Create New → LoadBalanceset
 Public Inbound Port - HTTP, RDP
2. All Services → Networking → Load Balancer
 → Create Load Balancer
 Name, Type - Public, SKU - Basic, Public IP - 1b-ip → Create
3. Lb → Backend pools → + Add.
 Name, Associated to → Availability Set
 + Add Target → Target VM, Network ip Config
4. Health Probe → + Add.
 Protocol - HTTP → OK
5. Add Load Balancing Rule
6. Install Web IIS Server on both VM and create a Webpage
7. New Copy public IP of lb and open
 IDLE TIMEOUT - 4 Min.

* Health Probe Originates from the IP address 168.63.129.16. Do not give this IP in VNet.

We will create all vms for load balancer in 1 availability set .

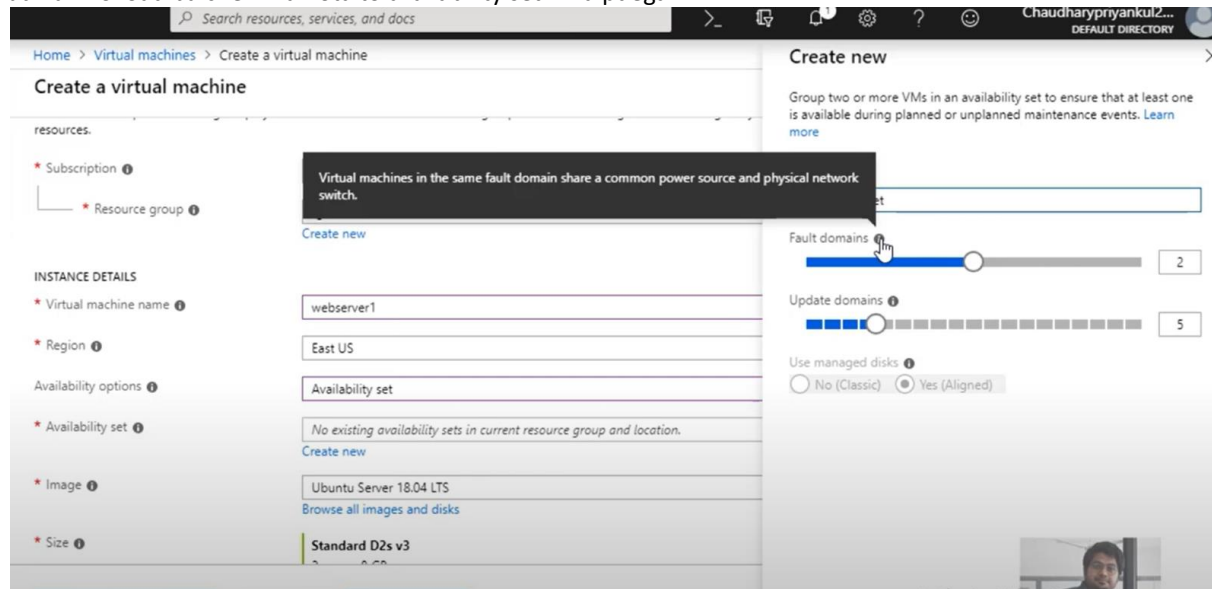
All resources behind load balancer are termed as backend pool . in target we select all vm which we want to be part of our lb .

IDLE_TIMEOUT = 4 min – mean 4 min tq ek he server p request jaegi 4 min tq agr kuch activity ni ki to server change hoga request ka .

Health probe check krega vm healthy hai ki ni .

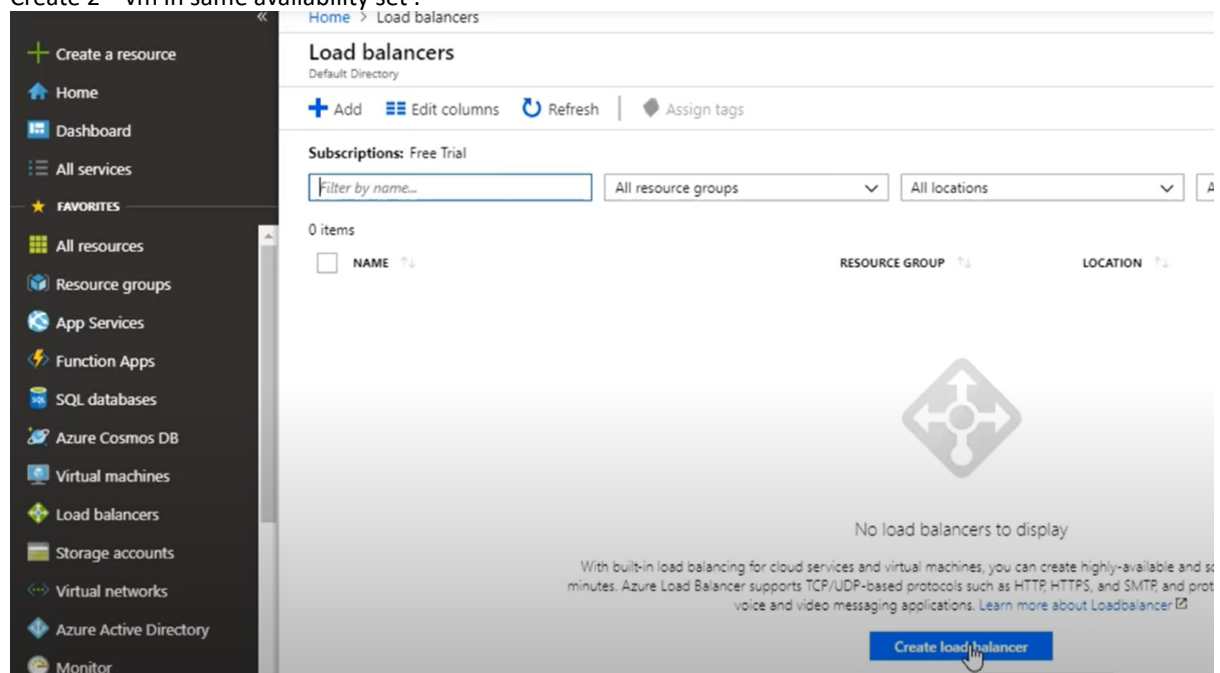
Create 2 vm .

Jb humko load balancer krna hota to availability set krna pdega .



Fault domain – 1 jga power supply ka issue aya to dusre vm m ni aega ,
Update domain –

Create 2nd vm in same availability set .



Create load balancer .

Home > Load balancers > Create load balancer

Create load balancer

* Name

* Type ⓘ
☐ Internal ☒ Public

* SKU ⓘ
☒ Basic ☐ Standard

* Public IP address ⓘ
☒ Create new ☐ Use existing

^ Configure public IP address

SKU
Basic

* Assignment
☒ Dynamic ☐ Static

We can choose any location for lb , choose same location as that of vms .

Home > Load balancers > lb-webserver

lb-webserver

Load balancer

Search (Ctrl+/)

Move Delete Refresh

Essentials ^

Resource group (change)	Backend pool
rg-web	-
Location	Health probe
East US	-
Subscription name (change)	Load balancing rule
Free Trial	-
Subscription ID	NAT rules
5bbadae8-bd21-4457-b835-cebdae44e033	-
SKU	Public IP address
Basic	lb-ip

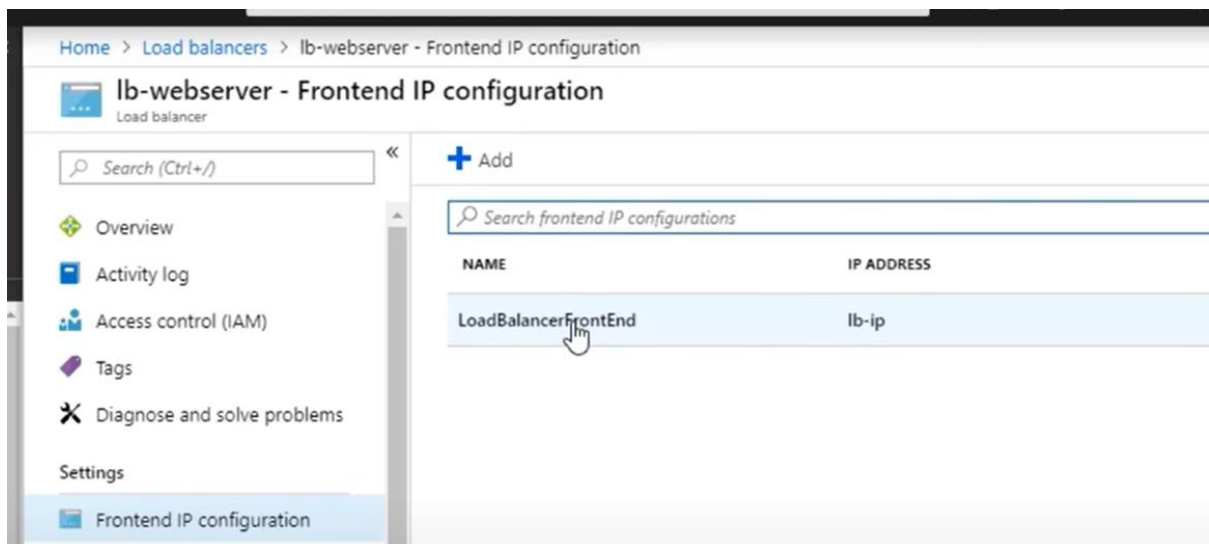
Overview

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

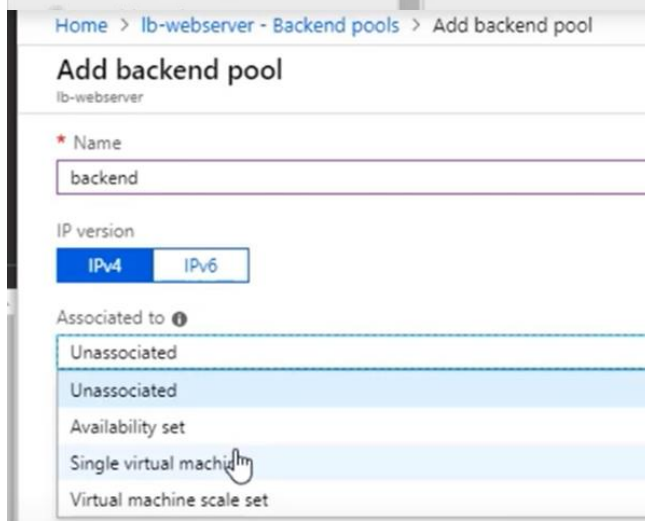
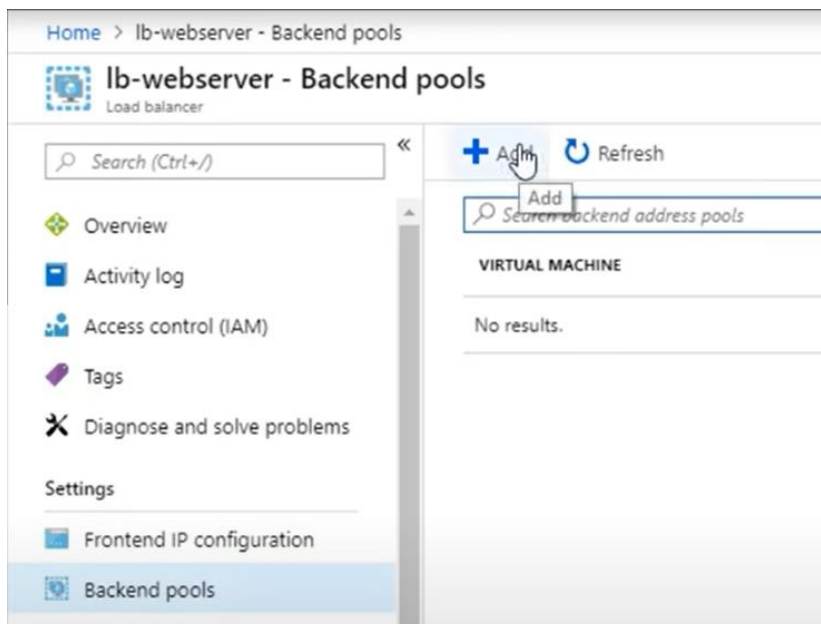
Settings

- Frontend IP configuration
- Backend pools
- Health probes
- Load balancing rules
- Inbound NAT rules
- Properties
- Locks
- Authentication

Activate Windows
Go to Settings



Frontend ip for load balancer .



We can associate load balancer to any of above , we are using availability set ,

HOME > lb-webserver > backend pools > Add backend pool

Add backend pool

lb-webserver

* Name
backend ✓

IP version
IPv4 IPv6

Associated to ⓘ
Availability set ▼

Availability set ⓘ
loadbalanceset
number of virtual machines: 2 ▼

Target network IP configurations
Only VMs within the current availability set can be chosen. Once a VM is chosen, you can select a network IP configuration related to it.
+ Add a target network IP configuration

+ Add a target network IP configuration

We can add target vms ,

Home > lb-webserver > Health probes > Add health

Add health probe

lb-webserver

* Name
health

IP version
IPv4

Protocol ⓘ
HTTP

* Port ⓘ
80

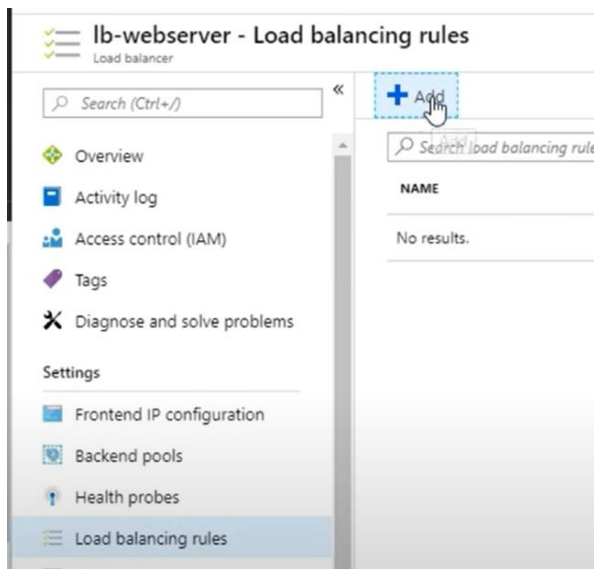
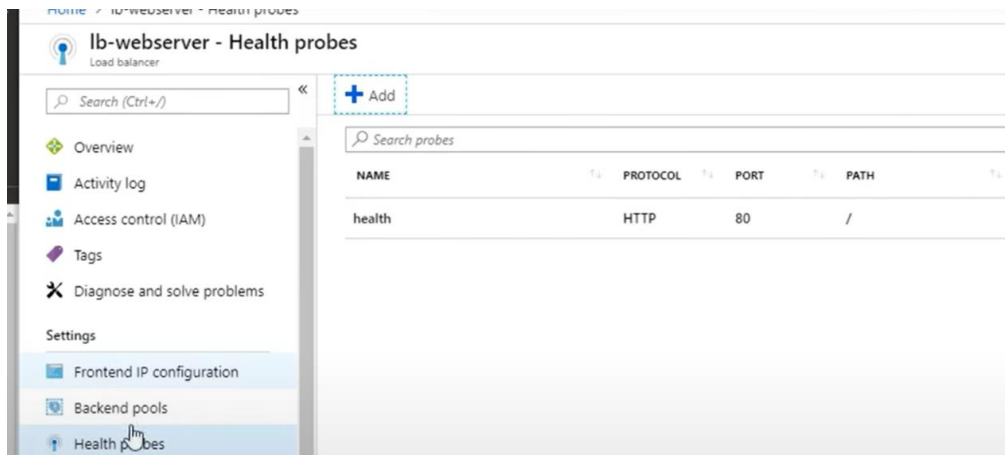
* Path ⓘ
/

* Interval ⓘ
5

* Unhealthy threshold ⓘ
2

Interval – every 5 min it will check connectivity .

Unhealthy threshold – if 2 continuous unhealthy events occurred in 5 mins then it will treat that server has error .



Add load balancing rules ,

Add load balancing rule

lb-webserver

* Name

lb-rule

* IP Version

☒ IPv4 ☐ IPv6

* Frontend IP address

LoadBalancerFrontEnd

Protocol

☒ TCP ☐ UDP

* Port

80

* Backend port

80

Backend pool

backend (2 virtual machines)

Health probe

health (HTTP:80)

Backend pool ⓘ
 backend (2 virtual machines) ▼

Health probe ⓘ
 health (HTTP:80) ▼

Session persistence ⓘ
 None ▼

Idle timeout (minutes) ⓘ
 4

Floating IP (direct server return) ⓘ

Agr 4 min se pehle dusre server p request route ni hogi .

Home > Load balancers > lb-webserver

lb-webserver

Load balancer

Search (Ctrl+/)

Move Delete Refresh

Essentials ^

Resource group (change)	rg-web	Backend pool	backend (2 virtual machines)
Location	East US	Health probe	health (HTTP:80)
Subscription name (change)	Free Trial	Load balancing rule	lb-rule (TCP/80)
Subscription ID	5bbadae8-bd21-4457-b835-cebdae44e033	NAT rules	-
SKU	Basic	Public IP address	40.117.249.129 (lb-ip)

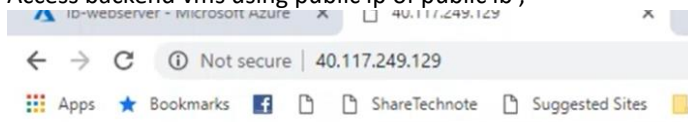
Overview

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

Settings

- Frontend IP configuration
- Backend pools
- Health probes

Access backend vms using public ip of public lb ,



THIS IS SERVER 2 CANADA SERVER