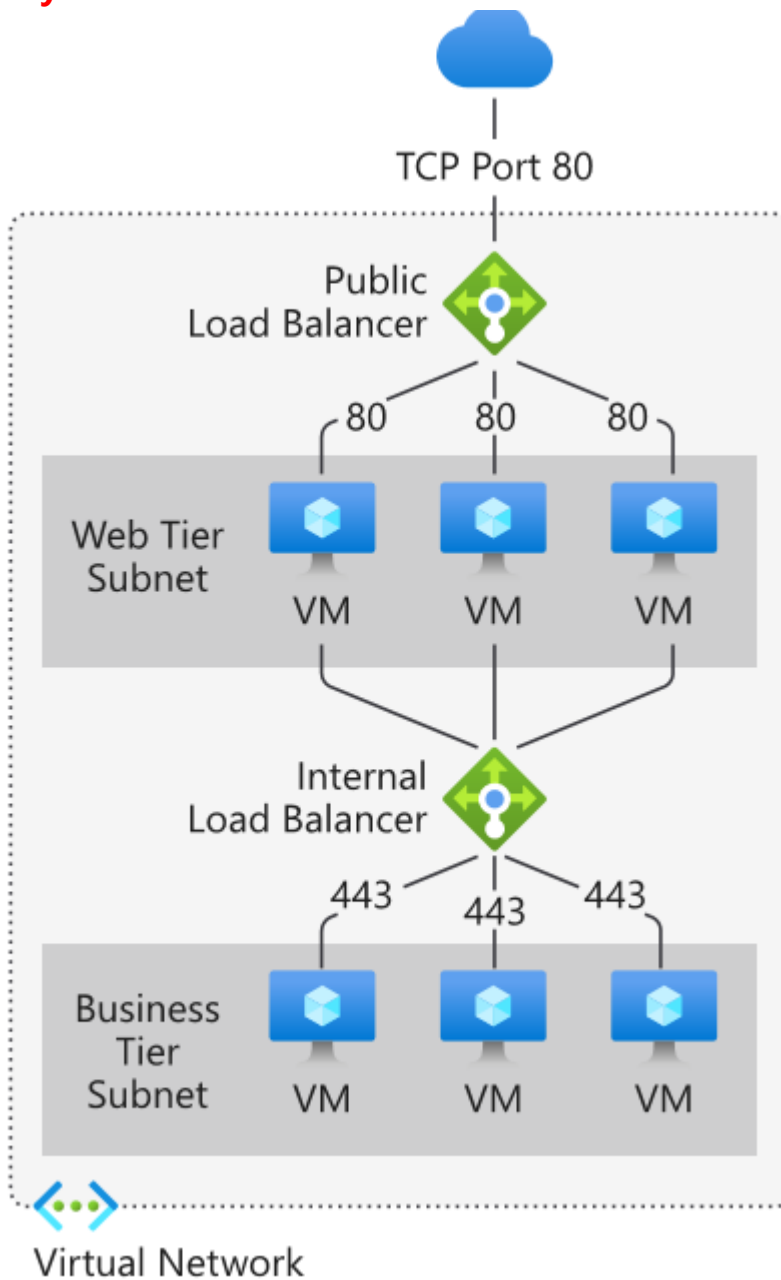


Azure Load Balancer

→ What is Azure Load Balancer?

- ✓ *Load balancing* refers to evenly distributing load (incoming network traffic) across a group of backend resources or servers.
- ✓ Azure Load Balancer operates at layer four of the Open Systems Interconnection (OSI) model. It's the single point of contact for clients. Load Balancer distributes inbound flows that arrive at the load balancer's front end to backend pool instances. These flows are according to configured load balancing rules and health probes. The backend pool instances can be Azure Virtual Machines or instances in a virtual machine scale set.
- ✓ A **public load balancer** can provide outbound connections for virtual machines (VMs) inside your virtual network. These connections are accomplished by translating their private IP addresses to public IP addresses. Public Load Balancers are used to load balance internet traffic to your VMs.
- ✓ An **internal (or private) load balancer** is used where private IPs are needed at the frontend only. Internal load balancers are used to load balance traffic inside a virtual network. A load balancer frontend can be accessed from an on-premises network in a hybrid scenario.

→ **Why use Azure Load Balancer?**



→ Why use Azure Load Balancer?

- ✓ With Standard Load Balancer, you can scale your applications and create highly available services. Load balancer supports both inbound and outbound scenarios. Load balancer provides low latency and high throughput, and scales up to millions of flows for all TCP and UDP applications.

Key scenarios that you can accomplish using Standard Load Balancer include:

- ✓ Load balance **internal** and **external** traffic to Azure virtual machines.
- ✓ Increase availability by distributing resources **within** and **across** zones.
- ✓ Configure **outbound connectivity** for Azure virtual machines.
- ✓ Use **health probes** to monitor load-balanced resources.
- ✓ Employ **port forwarding** to access virtual machines in a virtual network by public IP address and port.
- ✓ Enable support for **load-balancing** of **IPv6**.
- ✓ Standard Load Balancer provides multi-dimensional metrics through [Azure Monitor](#). These metrics can be filtered, grouped, and broken out for a given dimension. They provide current and historic insights into performance and health of your service. Resource Health is also supported. Review [Standard Load Balancer Diagnostics](#) for more details.
- ✓ Load balance services on **multiple ports, multiple IP addresses, or both**.
- ✓ Move **internal** and **external** load balancer resources across Azure regions.
- ✓ Load balance TCP and UDP flow on all ports simultaneously using **HA ports**.


Let's start work with Load Balancer

1) Login into Azure Portal by using your credentials.

2) Resource Group creation: -

A) Create a Resource Group with the name LBTEST and Location East US. As shown in the below picture.

[Basics](#) [Tags](#) [Review + create](#)


Resource group - A container that holds related resources for an Azure solution. The resource group can include all the resources for the solution, or only those resources that you want to manage as a group. You decide how you want to allocate resources to resource groups based on what makes the most sense for your organization. [Learn more](#) 

Project details

Subscription * 

Free Trial



Resource group * 

LBTEST 

Resource details

Region * 

(US) East US

[Review + create](#)

[< Previous](#)

[Next : Tags >](#)

B) Complete the Resource Group creation by clicking on Review +create and the create buttons.

Now we are going to create the Load Balancer

3) Load Balancer: -

A) In the Dashboard search box, search with the Load Balancers.

Load balancers

Default Directory

[+ Add](#) [≡ Edit columns](#) [↻ Refresh](#) [🏷 Assign tags](#)

Subscriptions: Free Trial

All resource groups

All locations

All tags

No grouping

1 items

☐ Name ↑↓

Resource group ↑↓

Location ↑↓

Subscription ↑↓

B) Now Click on the Add Button it will navigate to Load balance creation page.

[Basics](#) [Tags](#) [Review + create](#)

Azure load balancer is a layer 4 load balancer that distributes incoming traffic among healthy virtual machine instances. Load balancers use a hash-based distribution algorithm. By default, it uses a 5-tuple (source IP, source port, destination IP, destination port, protocol type) hash to map traffic to available servers. Load balancers can either be internet-facing where it is accessible via public IP addresses, or internal where it is only accessible from a virtual network. Azure load balancers also support Network Address Translation (NAT) to route traffic between public and private IP addresses. [Learn more.](#)

Project details

Subscription *	<div>Free Trial</div>
Resource group *	<div></div>

[Create new](#)

Instance details

Name *	<div></div>
Region *	<div>(US) East US 2</div>
Type * ⓘ	<div><input type="radio"/> Internal <input checked="" type="radio"/> Public</div>
SKU * ⓘ	<div><input checked="" type="radio"/> Basic <input type="radio"/> Standard</div>
Public IP address	
Public IP address * ⓘ	<div><input checked="" type="radio"/> Create new <input type="radio"/> Use existing</div>
Public IP address name *	<div></div>
Public IP address SKU	<div>Basic</div>
Assignment *	<div><input checked="" type="radio"/> Dynamic <input type="radio"/> Static</div>
Add a public IPv6 address ⓘ	<div><div>No</div><div>Yes</div></div>

C) Fill the following details in the above fields.

- Name: TestLB
- Region: East Us
- Type: Public
- SKU: Standard
- Public IP Address: Create New
- Public Ip address name: TestLBPIP
- Availability zone: Zone-redundant
- Add a public IPv6 address: Leave as it is

D) Then click on Review + create and then create.

E) Your Load Balancer is created.

F) After creating the Load Balancer go to the Overview of TestLB Load balancer.

TestLB

Load balancer

Search (Ctrl+ /)

MoveDeleteRefresh

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

Outbound rules

Properties

Resource group (change) : LBTEST

Location : East US

Subscription (change) : Free Trial

Subscription ID : 1686da83-b00d-4e9d-8f9f-130dfb63f05d

SKU : Standard

Tags (change) : Click here to add tags

Backend pool : -

Health probe : -

Load balancing rule : -

NAT rules : 0 inbound

Public IP address : 52.188.216.137 (TestLBPIP)

Configure high availability and scalability for your applications

Create highly-available and scalable applications in minutes by using built-in load balancing for cloud services and virtual machines. Azure Load Balancer supports TCP/UDP-based protocols and protocols used for real-time voice and video messaging applications. [Learn more](#)

Balance IPv4 and IPv6 addresses

Native dual-stack endpoints help meet regulatory

Build highly reliable applications

G) Now click on the Backend pools in the Settings. It will navigate to another page.

AddRefresh

Backend pool	Virtual machine	Virtual machine status	Network interface	Private IP address
No results				

H) In this page Click on Add button to add the backend pool (VMS).

Note: Still we are not created any VMS.

Add backend pool

TestLB

Name *

TestBackend

Virtual network ⓘ

IP version

IPv4

IPv6

Virtual machines

You can only attach virtual machines in eastus that have a standard SKU public IP configuration or no public IP configuration. All IP configurations must be on the same virtual network.

+ Add

✕ Remove

Virtual machine ↑↓

IP Configuration ↑↓

Availability set ↑↓

No virtual machines selected

Add

I) Now Add the following details in the Add Backend pool page

- Name : TestBackend
- Virtual Network: Leave it empty
- IPVersion: Leave it as it is

J) Now click on Add button

K) Now go to the overview of TestLB and click on Healthprob under the settings.

J) Click on Add button to add **Health probes**.

K) Enter the following details in Add **Health probe** page

- Name: TestHealthprobe
- Protocol: Select HTTP
- Interval: Set as 15 secs
- Leave remaining fields as it is
- Click on **OK** Button

Add health probe

TestLB

Name *

TestHealthprobe

Protocol ⓘ

HTTP

Port * ⓘ

80

Path * ⓘ

/

Interval * ⓘ

15

seconds

Unhealthy threshold * ⓘ

2

consecutive failures

OK

L) Now go to the TestLB overview and click on the Load balancing rules under the settings and then click on the Add button to add the Load balancing rules.

TestLB | Load balancing rules

Load balancer

Search (Ctrl+/)

« + Add

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

Outbound rules

Properties

Search load balancing rules

Name	↕	Load balancing rule	↕	Backend pool	↕	Health probe	↕
No results.							

M) In the Load balancing rule page just add the name as **TestLBRule** and leave the remaining fields as it is and click on **OK** Button.

Add load balancing rule

TestLB

Name *

TestLBRules

IP Version *

☒ IPv4 ☐ IPv6

Frontend IP address * ⓘ

52.188.216.137 (LoadBalancerFrontEnd)

Protocol

☒ TCP ☐ UDP

Port *

80

Backend port * ⓘ

80

Backend pool ⓘ

TestBackend

OK

4) Create the Virtual Network

Name: LBNV

IPAddress: 10.5.0.0/16

Subnet:10.5.1.0/24

5) Virtual Machines

A) Now we need to create the two VMS. For this search the Virtual Machines in the search box in the dashboard and click on Add button to create the virtual machines.

Virtual Machine 1:

1. Basic:

Resource Group: TestLB1

Location: East US

Virtual Machine Name: TestVM1

Availability options: Availability zone

Availability zone: 1

Image: Windows server 2019 Datacenter

Size: B2ms

User Name: Azureuser

Password: Azureuser@123

Public inbound rules: Allow selected ports

Select inbounds port: RDP

2.Disks:

No changes

3.Network Interface

Virtual Network: Don't change any thing

Subnet: Don't change any thing

Public Ip: Click **Create New** and set as availability zone as **Zone-redundant** and click on **OK**.

Create public IP address ×

Name *

SKU ⓘ
☐ Basic ☒ Standard

i Availability zones are only supported on Standard SKU public IP addresses.

Assignment ⓘ
☒ Static

Availability zone ⓘ
☒ Zone-redundant ☐ Zone 1

OK

NIC network security group: Advanced

Select Inbound ports: RDP

Accelerate Network: Off

Load Balancing: Yes

Place this virtual machine behind an existing load balancing solution?

☒ Yes ☐ No

Load balancing settings

- **Application Gateway** is an HTTP/HTTPS web traffic load balancer with URL-based routing, SSL termination, session persistence, and web application firewall. [Learn more about Application Gateway](#)
- **Azure Load Balancer** supports all TCP/UDP network traffic, port-forwarding, and outbound flows. [Learn more about Azure Load Balancer](#)

Load balancing options * ⓘ

Azure load balancer

Select a load balancer * ⓘ

TestLB

Select a backend pool * ⓘ

TestBackend

[Create new](#)

Load Balancing options: Azure load balancer

Select a load balancer: TestLB

Select a backend pool: TestBackend

4)Management

Turn off boot diagnostics and keep remaining fields as it is.

5) Advanced

Click on **Review + Create** and then click **Create**.

Virtual Machine 2:

2. Basic:

Resource Group: TestLB

Location: East US

Virtual Machine Name: TestVM2

Availability options: Availability zone

Availability zone: 2

Image: Windows server 2019 Datacenter

Size: B2ms

User Name: Azureuser

Password: Azureuser@123

Public inbound rules: Allow selected ports

Select inbounds port: RDP

2.Disks:

No changes

3.Network Interface

Virtual Network: Don't change any thing

Subnet: Don't change any thing

Public Ip: TestVM2-ip

NIC network security group: Advanced

Select Inbound ports: RDP

Accelerate Network: Off

Load Balancing: Yes

Place this virtual machine behind an existing load balancing solution?

☒ Yes ☐ No

Load balancing settings

- **Application Gateway** is an HTTP/HTTPS web traffic load balancer with URL-based routing, SSL termination, session persistence, and web application firewall. [Learn more about Application Gateway](#)
- **Azure Load Balancer** supports all TCP/UDP network traffic, port-forwarding, and outbound flows. [Learn more about Azure Load Balancer](#)

Load balancing options * ⓘ

Azure load balancer

Select a load balancer * ⓘ

TestLB

Select a backend pool * ⓘ

TestBackend

[Create new](#)

Load Balancing options: Azure load balancer

Select a load balancer: TestLB

Select a backend pool: TestBackend

4) Management

Turn off **boot diagnostics** and keep remaining fields as it is.

5) Advanced

Click on **Review + Create** and then click **Create**.

6) Network Security Groups:

1) search the Network Security Groups.

2) Now select the **TestVM1-nsg**

TestVM1-nsg
Network security group

Search (Ctrl+/) << → Move Delete Refresh

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

Settings
Inbound security rules
Outbound security rules
Network interfaces
Subnets
Properties

Resource group (change) : LBTEST
Location : East US
Subscription (change) : Free Trial
Subscription ID : 1686da83-b00d-4e9d-8f9f-130dfb63f05d
Tags (change) : Click here to add tags

Custom security rules : 1 inbound, 0 outbound
Associated with : 0 subnets, 1 network interfaces


Priority	Name	Port	Protocol	Source	Destination	Action	
300	⚠ RDP	3389	TCP	Any	Any	✔ Allow	...
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	✔ Allow	...
65001	AllowAzureLoadBalancer...	Any	Any	AzureLoadBalancer	Any	✔ Allow	...
65500	DenyAllInBound	Any	Any	Any	Any	✖ Deny	...

3) Select the Inbound security rules under Settings.


+ Add Default rules Refresh

Priority	Name	Port	Protocol	Source	Destination	Action	
300	⚠ RDP	3389	TCP	Any	Any	✔ Allow	...
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	✔ Allow	...
65001	AllowAzureLoadBalancerInBo...	Any	Any	AzureLoadBalancer	Any	✔ Allow	...
65500	DenyAllInBound	Any	Any	Any	Any	✖ Deny	...

4) click on the Add button to add the security rules.

 **Add inbound security rule** ×

TestVM1-nsg

 Basic

Source * ⓘ

Any

Source port ranges * ⓘ

*

Destination * ⓘ

Any

Destination port ranges * ⓘ

8080

Protocol *

Any TCP UDP ICMP

Action *

Allow Deny

Priority * ⓘ

Add

5) Click on the Basic tab.

 **Add inbound security rule** ×

TestVM1-nsg

 Advanced

Service ⓘ

Custom

Port ranges * ⓘ

8080

Priority * ⓘ

310

Name *

Port_8080

Description

Add

6) select the **service** as **HTTP** and Name as **HTTP_8080** and click on Add button.

Note: Repeat the same steps for TestVM2-nsg

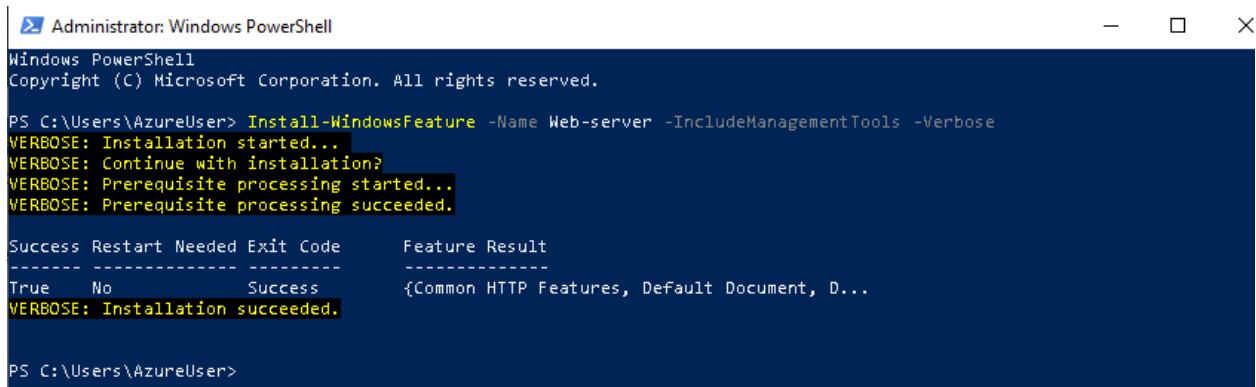
7) Now go to the **TestVM1** virtual Machine and select the **Networking** tab under the settings. And copy the **NIC Public IP**.

8) Using this IP address open the Remote Virtual Machine and similarly copy the **NIC Public IP** of second VM and open the remote virtual machine.

9) Now we need to create the IIS in the two VMS. For this open the Powershell as administrator in both the VMS and run the following command.

Install-WindowsFeature -Name Web-server -IncludeManagementTools -Verbose

10) After successful installation of IIS in the VMS the following message will be display in powershell command prompt.



```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS C:\Users\AzureUser> Install-WindowsFeature -Name Web-server -IncludeManagementTools -Verbose
VERBOSE: Installation started...
VERBOSE: Continue with installation?
VERBOSE: Prerequisite processing started...
VERBOSE: Prerequisite processing succeeded.

Success Restart Needed Exit Code      Feature Result
-----
True      No              Success      {Common HTTP Features, Default Document, D...
VERBOSE: Installation succeeded.

PS C:\Users\AzureUser>
```

11) Run the Following two commands in powershell to remove the iisstart page and add the content in iisstart page.

Remove-Item C:\inetpub\wwwroot\iisstart.htm -Force -Recurse -Verbose

Add-Content -Path "C:\inetpub\wwwroot\iisstart.htm" -Value \$("Hello LoadBalancer Node " + \$env:COMPUTERNAME)

12) Now to the Test LB Load balancer and copy the public IP and paste it in browser.

TestLB

Load balancer

Search (Ctrl+/)

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

Outbound rules

→ Move

🗑 Delete

🔄 Refresh

Resource group [\(change\)](#) : LBTEST

Location : East US

Subscription [\(change\)](#) : Free Trial

Subscription ID : 1686da83-b00d-4e9d-8f9f-130dfb63f05d

SKU : Standard

Tags [\(change\)](#) : [Click here to add tags](#)

Backend pool : TestBackend (2 virtual machines)

Health probe : TestHealthprobe (Http:80)

Load balancing rule : TestLB

NAT rules : 0 inbound

Public IP address : 52.188.216.137 (TestLBPIP)

Copy to clipboard

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Balance IPv4 and IPv6 addresses

Build highly reliable applications