

R&D Document on Internal & External Load Balancer Setup in Azure

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Project Title: Deploying and Testing Internal and External Load Balancers on Azure Virtual Machines

Objective

The objective is to:

- Understand the use of **Azure Load Balancers** (internal and external).
 - Create each type of load balancer.
 - Deploy and configure **backend VMs**.
 - Validate traffic distribution by **testing connectivity**.
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What is Azure Load Balancer?

Azure Load Balancer is a **Layer-4 (TCP, UDP)** load balancer that distributes **inbound traffic** among healthy instances.

Types of Azure Load Balancers

Load Balancer Type	Description	Use Case
Public (External)	Routes traffic from the internet to VMs	Web servers, public apps
Internal (Private)	Routes traffic inside a virtual network	Backend services, internal APIs

Concepts & Components

◆ Frontend IP Configuration

Defines the IP address the load balancer listens on.

◆ Backend Pool

Set of VMs or NICs where traffic is distributed.

◆ Health Probe

Checks VM availability (TCP, HTTP, HTTPS).

◆ Load Balancing Rule

Defines how traffic is distributed.

Implementation Steps

✓ Phase 1: Create VNet and Subnets

- VNet Name: LB-VNet
- Address space: 10.0.0.0/16
- Subnet1: Frontend → 10.0.1.0/24
- Subnet2: Backend → 10.0.2.0/24

Create virtual network

Name

Address space

[+ Add subnet](#)

Subscription

Resource group

[Create new](#)

Region

Subnet

Subnet name

Subnet address range

Nat gateway

Network security group

Route table

✓ Phase 2: Deploy Virtual Machines

- VM1 (Backend): VM-1
 - VM2 (Backend): VM-2
 - OS: Ubuntu/Windows Server
 - Place both VMs in the **Backend subnet**
 - Install a sample web server (e.g., Nginx or IIS)
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✓ Phase 3: Create an Internal Load Balancer

1. **Go to Azure Portal** → Create → **Load Balancer**
2. **Type:** Internal
3. **Frontend IP:** Private IP from Backend subnet
4. **Backend Pool:** Add VM-1, VM-2
5. **Health Probe:**
 - Protocol: HTTP
 - Port: 80
6. **Load Balancing Rule:**
 - Frontend: Internal IP
 - Backend: Pool
 - Port: 80

✓ **Verify:** SSH into a third VM in the same VNet and curl/ping the internal IP of the load balancer.

Create a load balancer



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Subscription	Visual Studio Enterprise Subscripri!
Resource group	LB-RG
	Create new
Region	East US
Type	Internal
SKU	Standard
Private IP address	<input type="radio"/> Dynamic <input checked="" type="radio"/> Static
	10.0.2.4
Availability zone	(None)
TCP Reset on idle connections	<input checked="" type="checkbox"/> Enabled

[Review + create](#)

☒ Phase 4: Create an External Load Balancer

1. **Go to Azure Portal** → Create → **Load Balancer**
2. **Type:** Public
3. **Frontend IP:** Public IP (SKU: Standard, Static)
4. **Backend Pool:** Same VM-1, VM-2
5. **Health Probe:**
 - Protocol: HTTP

- Port: 80

6. Load Balancing Rule:

- Frontend: Public IP
- Backend: Pool
- Port: 80

✓ **Verify:** Access via browser using public IP: `http://<loadbalancer-ip>`

Microsoft Azure

Create a resource

Home

Dashboard

All services

Create load balancer

Subscription

Visual Studio Enterprise Subscription

Resource group

RG-LoadBalancer

Name

MyLoadBalancer

Region

East US

Type

☒ Public – Load balances incoming internet traffic to your VMs

☐ Internal – Load balances traffic on your virtual network

Frontend IP configuration

Frontend IP

Public IP address

Public IP address

myPublicIP

SKU

Standard

Assignment

Static

Review + create

Next: Backend pools

Name

myHealthProbe

Protocol



HTTP



TCP

Port

80

Path

/

Interval

Seconds

5

Unhealthy threshold

2 Attempts

Testing Output Screens

1. Internal LB IP accessed via internal VM (curl success).
2. External LB IP accessed via browser (HTTP success).
3. Backend Pool Status: Healthy.
4. Azure Load Balancer Metrics: Probe success, backend up.

Summary Table

Component	Internal LB	External LB
IP Type	Private IP	Public IP
Access Scope	Within VNet	From Internet
Use Case	Microservices / DB access	Public web applications
Health Probe Used	HTTP	HTTP
Rule Configuration	Port 80 mapped to backend port 80	Same

✓ Key Learnings

- Difference between **internal vs external load balancing**.
 - Health probes are essential to check the **availability of instances**.
 - Load Balancer distributes **traffic evenly** only when **probes succeed**.
 - NSGs must allow **probe and port access** (e.g., port 80/443).
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🔧 Troubleshooting Tips

Problem	Solution
No response from load balancer	Check NSG rules and open ports (80/443)
Probes failing	Confirm backend VMs are running the service
Load balancer not distributing	Ensure all backends are healthy and reachable