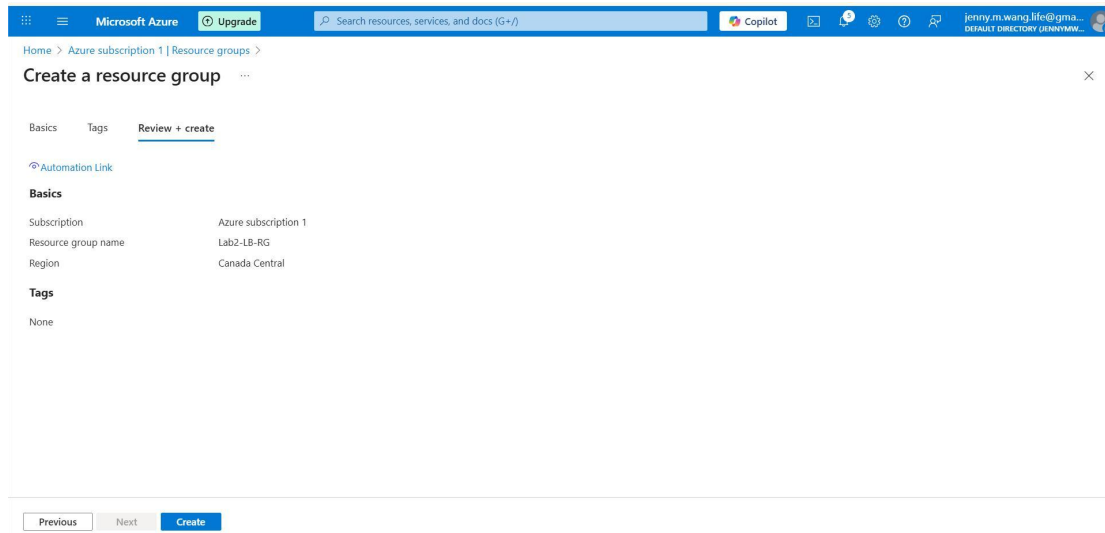


## Lab 2 Azure Load Balancer

**Lab Objective:** Deploy a high-availability web application using two Windows Virtual Machines behind a Standard Azure Public Load Balancer, demonstrating load balancing, backend pool configuration, and health monitoring.

### Step 1 – Create a Resource Group



The screenshot shows the 'Create a resource group' page in the Azure portal. The page has three tabs: 'Basics', 'Tags', and 'Review + create'. The 'Review + create' tab is active. Under the 'Basics' section, the following information is displayed:

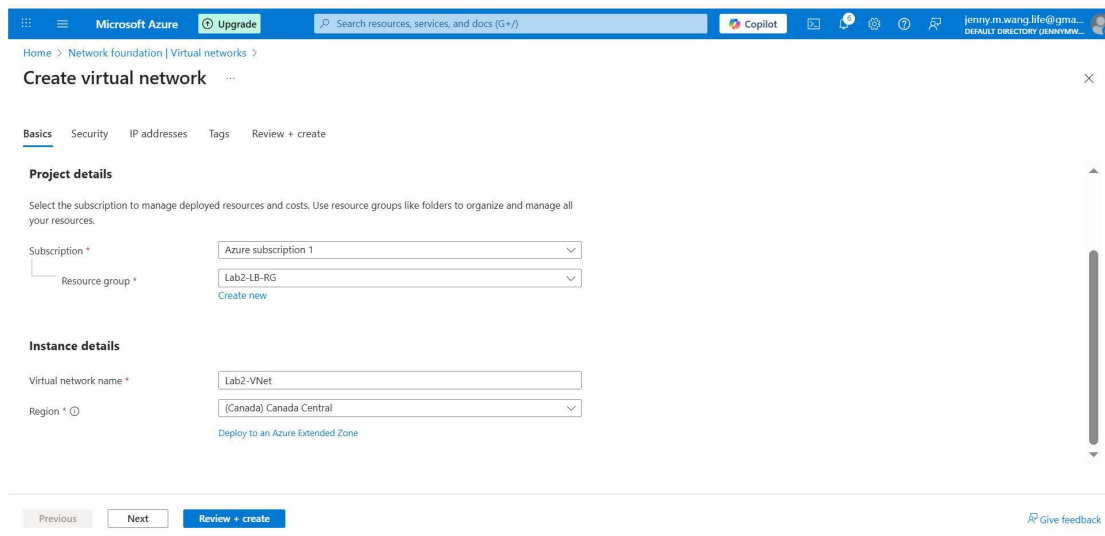
Field	Value
Subscription	Azure subscription 1
Resource group name	Lab2-LB-RG
Region	Canada Central

Under the 'Tags' section, the value is 'None'. At the bottom of the page, there are three buttons: 'Previous', 'Next', and 'Create'.

Created a dedicated resource group: Lab2-LB-RG in Canada Central to organize all lab resources.

### Step 2 – Create a Virtual Network

Build a network that both VMs and the load balancer will use:



The screenshot shows the 'Create virtual network' page in the Azure portal. The page has five tabs: 'Basics', 'Security', 'IP addresses', 'Tags', and 'Review + create'. The 'Basics' tab is active. The page is divided into two main sections: 'Project details' and 'Instance details'.

**Project details**

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Field	Value
Subscription *	Azure subscription 1
Resource group *	Lab2-LB-RG

[Create new](#)

**Instance details**

Field	Value
Virtual network name *	Lab2-VNet
Region * ⓘ	(Canada) Canada Central

[Deploy to an Azure Extended Zone](#)

At the bottom of the page, there are three buttons: 'Previous', 'Next', and 'Review + create'. A 'Give feedback' link is also present in the bottom right corner.

Edit subnet:

Microsoft Azure | Upgrade | Search resources, services, and docs (G+/I) | Copilot | jenny.m.wang.life@gmail.com | DEFAULT DIRECTORY JENNYMWW...

Home > Network foundation | Virtual networks >

## Create virtual network

Basics Security IP addresses Tags Review + create

☐ Allocate using IP address pools. [Learn more](#)

+ Add a subnet

Subnets	IP address range	Size	NAT gateway
default	10.0.0.0 - 10.0.255.255	/24 (256 addresses)	-

+ Add IPv4 address space

Previous Next Review + create

### Edit 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

Name

**IPv4**

Include an IPv4 address space ☒

IPv4 address range

Starting address

Size

Subnet address range

**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

Save Cancel Give feedback

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Home > Network foundation | Virtual networks >

## Create virtual network

Basics Security IP addresses Tags Review + create

Deploying...

Resource Group: Lab2-LB-RG  
Name: Lab2-VNet  
Region: Canada Central

**Security**

Azure Bastion: Disabled  
Azure Firewall: Disabled  
Azure DDoS Network Protection: Disabled

**IP addresses**

Address space: 10.0.0.0/16 (65,536 addresses)  
Subnet: web-subnet (10.0.0.0/24) (256 addresses)

**Tags**

Previous Next Create Download a template for automation

\*\*\* Submitting deployment...  
Submitting the deployment template for resource group 'Lab2-LB-RG'.

Created a virtual network: Lab2-VNet with a single subnet web-subnet (10.0.0.0/24) to host the VMs and Load Balancer.

### Step 3 – Create VMs

Microsoft Azure | Upgrade | Search resources, services, and docs (G+/I) | Copilot | jenny.m.wang.life@gmail.com | DEFAULT DIRECTORY JENNYMWW...

Home > Compute infrastructure | Virtual machines >

## Create a virtual machine

Help me create a low cost VM | Help me create a VM optimized for high availability | Help me choose the right VM size for my workload

Help me create a low cost VM | Help me create a VM optimized for high availability | Help me choose the right VM size for my workload

Subscription

Resource group

**Instance details**

Virtual machine name

Region

Availability options

Security type

Image

VM architecture ☐ ☒

< Previous Next : Disks > Review + create Give feedback

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Home > Compute infrastructure > Virtual machines >

## Create a virtual machine

Help me create a low cost VM Help me create a VM optimized for high availability Help me choose the right VM size for my workload

Help me create a low cost VM Help me create a VM optimized for high availability Help me choose the right VM size for my workload

Size \*  [See all sizes](#)

Enable Hibernation ☐

**Administrator account**

Username \*

Password \*

Confirm password \*

**Inbound port rules**

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports \* ☐ None ☒ Allow selected ports

Select inbound ports \*

< Previous Next: Disks > Review + create Give feedback

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Home > Compute infrastructure > Virtual machines >

## Create a virtual machine

Help me create a low cost VM Help me create a VM optimized for high availability Help me choose the right VM size for my workload

Help me create a low cost VM Help me create a VM optimized for high availability Help me choose the right VM size for my workload

**Network interface**

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

Virtual network \*  [Create new](#)

Subnet \*  [Manage subnet configuration](#)

Public IP  [Create new](#)

NIC network security group ☐ None ☒ Basic ☐ Advanced

Public inbound ports \* ☐ None ☒ Allow selected ports

Select inbound ports \*

< Previous Next: Management > Review + create Give feedback

Next, create VM 2, which will be almost identical — this ensures the Load Balancer can distribute traffic evenly.

Summary: Deployed WebVM1 and WebVM2 (Windows Server 2022 Datacenter) in the web-subnet; Configured inbound rules to allow RDP (3389) and HTTP (80); Will use Azure Bastion for secure RDP connections without assigning public IPs.

## Step 4 – Create the Public Load Balancer

Microsoft Azure

Upgrade

Search resources, services, and docs (G+)

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DEFAULT DIRECTORY (WORKSPACE)

Home > Load balancing and content delivery > Load balancers >

Create load balancer

Basics

Frontend IP configuration

Backend pools

Inbound rules

Outbound rules

Tags

Review + create

A frontend IP configuration is an IP address used for inbound and/or outbound communication as defined within load balancing, inbound NAT, and

+ Add a frontend IP configuration

Name ↑

IP address ↓

Add a frontend IP to get started

Add frontend IP configuration

Lab2-PublicLB

Name \*

LB-Frontend

IP version

☒ IPv4

☐ IPv6

IP type

☒ IP address

☐ IP prefix

Public IP address \*

(new) LB-PublicIP

Create new

Gateway Load balancer

None

Save

Cancel

Give feedback

**Add backend pool**

Name \*  
WebVMs-Pool

Virtual network ⓘ  
Lab2-VNet (Lab2-LB-RG)

The dropdown only shows virtual networks in the same subscription and location as the load balancer. If you don't see the one you're looking for, it's either in another subscription or location or you don't have access to it.

Backend Pool Configuration

- NIC
- IP address

### IP configurations

IP configurations associated to virtual machines and virtual machine scale sets must be in same location as the load balancer and be in the same virtual network.

+ Add | X Remove

Resource Name	Resource group	Type	IP configuration	IP Address	Availability set
WebVM1	Lab2-LB-RG	Virtual machine	ipconfig1	10.0.0.4	-
WebVM2	Lab2-LB-RG	Virtual machine	ipconfig1	10.0.0.5	-

Save Cancel Give feedback

**Add load balancing rule**  
 HTTP-Rule

IP version: ☒ IPv4 ☐ IPv6

Frontend IP address: LB-Frontend (4.229.162.238)

Backend pool: WebVMs-Pool

Protocol: ☒ TCP ☐ UDP

Port: 80

Backend port: 80

Health probe: No existing probes

Session persistence: None

Idle timeout (minutes): 4

Enable TCP Reset: ☐

Enable Floating IP: ☐

Outbound source network address: ☒ (Recommended) Use outbound rules to provide backend pool members access

**Save** Cancel

Create a Health Probe HTTP-Probe and click Save.

## Step 7 — Test the Load Balancer

Install IIS on WebVM1, using Azure Bastion to connect:

```

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

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\azureuser> Install-WindowsFeature -Name Web-Server -IncludeManagementTools

Success Restart Needed Exit Code      Feature Result
-----
True      No              Success      {Common HTTP Features, Default Document, D...
  
```

Add a custom page for testing Load Balancer:

```

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

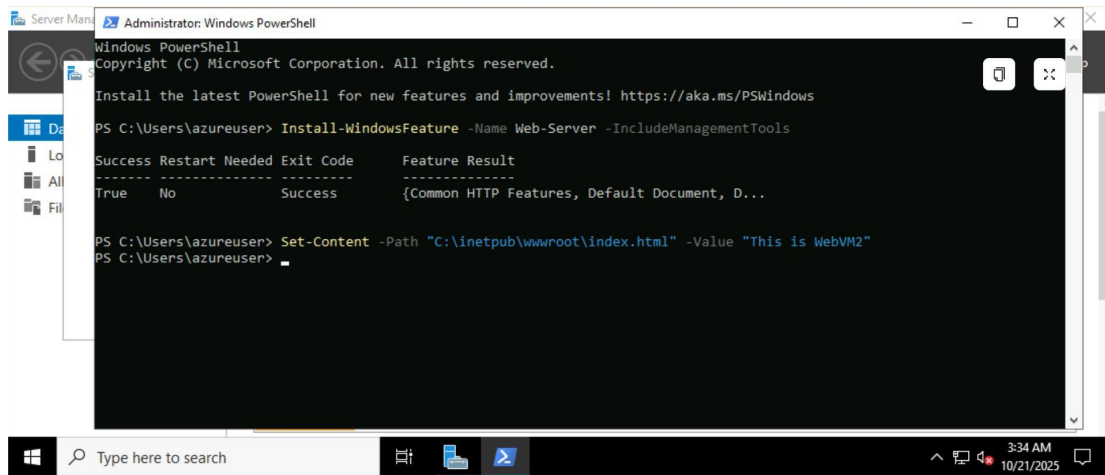
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\azureuser> Install-WindowsFeature -Name Web-Server -IncludeManagementTools

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

PS C:\Users\azureuser> Set-Content -Path "C:\inetpub\wwwroot\index.html" -Value "This is WebVM1"
PS C:\Users\azureuser>
  
```

Now WebVM1 has IIS installed and is serving a page. Repeat the process for WebVM2:

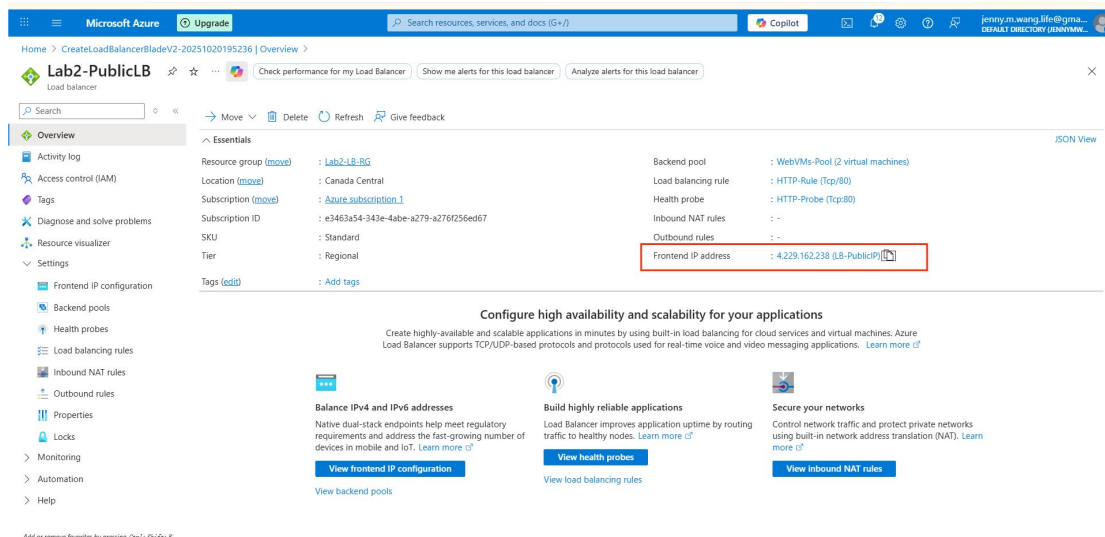


Summary: Created custom index pages on each VM to verify load balancing:

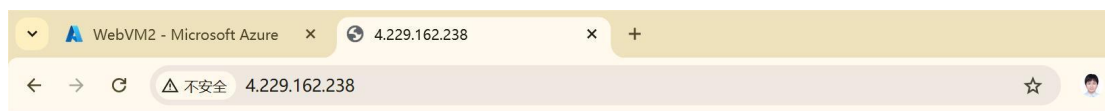
WebVM1 → "This is WebVM1"

WebVM2 → "This is WebVM2"

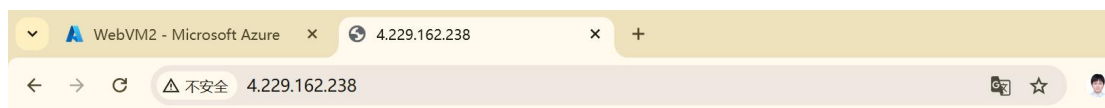
To confirm the Load Balancer's working, copy the frontend IP address:



Open a browser → paste the public IP and refresh several times:



This is WebVM1



This is WebVM2

So, the Load Balancer is forwarding HTTP traffic; The Backend Pool is working; IIS on both VMs is serving content.

My Load Balancer is distributing traffic between two IIS VMs.