Create a public load balancer with an IP-based backend using the Azure portal

In this tutorial, you'll learn how to create a public load balancer with an IP based backend pool.

A traditional deployment of Azure Load Balancer uses the network interface of the virtual machines. With an IP-based backend, the virtual machines are added to the backend by IP address.

In this tutorial, you learn how to:

* Create a virtual network
* Create a NAT gateway for outbound connectivity
* Create an Azure Load Balancer
* Create an IP based backend pool
* Create two virtual machines
* Test the load balancer

**Prerequisites**

* An Azure account with an active subscription. Create an account for free.

**Create a virtual network**

In this section, you'll create a virtual network for the load balancer, NAT gateway, and virtual machines.

1. Sign in to the [Azure portal](https://portal.azure.com/).
2. On the upper-left side of the screen, select **Create a resource > Networking > Virtual network** or search for **Virtual network** in the search box.
3. Select **Create**.
4. In **Create virtual network**, enter or select this information in the **Basics** tab:

| **Setting** | **Value** |
| --- | --- |
| **Project Details** |  |
| Subscription | Select your Azure subscription |
| Resource Group | Select **TutorPubLBIP-rg** |
| **Instance details** |  |
| Name | Enter **myVNet** |
| Region | Select **(US) East US** |

1. Select the **IP Addresses** tab or select the **Next: IP Addresses** button at the bottom of the page.
2. In the **IP Addresses** tab, enter this information:

| **Setting** | **Value** |
| --- | --- |
| IPv4 address space | Enter **10.1.0.0/16** |

1. Under **Subnet name**, select the word **default**.
2. In **Edit subnet**, enter this information:

| **Setting** | **Value** |
| --- | --- |
| Subnet name | Enter **myBackendSubnet** |
| Subnet address range | Enter **10.1.0.0/24** |

1. Select **Save**.
2. Select the **Security** tab.
3. Under **BastionHost**, select **Enable**. Enter this information:

| **Setting** | **Value** |
| --- | --- |
| Bastion name | Enter **myBastionHost** |
| AzureBastionSubnet address space | Enter **10.1.1.0/27** |
| Public IP Address | Select **Create new**. For **Name**, enter **myBastionIP**. Select **OK**. |

1. Select the **Review + create** tab or select the **Review + create** button.
2. Select **Create**.

**Create NAT gateway**

In this section, you'll create a NAT gateway and assign it to the subnet in the virtual network you created previously.

1. On the upper-left side of the screen, select **Create a resource > Networking > NAT gateway** or search for **NAT gateway** in the search box.
2. Select **Create**.
3. In **Create network address translation (NAT) gateway**, enter or select this information in the **Basics** tab:

| **Setting** | **Value** |
| --- | --- |
| **Project Details** |  |
| Subscription | Select your Azure subscription. |
| Resource Group | Select **Create new** and enter **TutorPubLBIP-rg** in the text box. Select **OK**. |
| **Instance details** |  |
| Name | Enter **myNATgateway** |
| Region | Select **(US) East US** |
| Availability Zone | Select **None**. |
| Idle timeout (minutes) | Enter **10**. |

1. Select the **Outbound IP** tab, or select the **Next: Outbound IP** button at the bottom of the page.
2. In the **Outbound IP** tab, enter or select the following information:

| **Setting** | **Value** |
| --- | --- |
| Public IP addresses | Select **Create a new public IP address**. In **Name**, enter **myPublicIP-NAT**. Select **OK**. |

1. Select the **Subnet** tab, or select the **Next: Subnet** button at the bottom of the page.
2. In the **Subnet** tab, select **myVNet** in the **Virtual network** pull-down.
3. Check the box next to **myBackendSubnet**.
4. Select the **Review + create** tab, or select the blue **Review + create** button at the bottom of the page.
5. Select **Create**.

**Create load balancer**

In this section, you'll create a zone redundant load balancer that load balances virtual machines. With zone-redundancy, one or more availability zones can fail and the data path survives as long as one zone in the region remains healthy.

During the creation of the load balancer, you'll configure:

* Frontend IP address
* Backend pool
* Inbound load-balancing rules

1. In the search box at the top of the portal, enter **Load balancer**. Select **Load balancers** in the search results.
2. In the **Load balancer** page, select **Create**.
3. In the **Basics** tab of the **Create load balancer** page, enter, or select the following information:

| **Setting** | **Value** |
| --- | --- |
| **Project details** |  |
| Subscription | Select your subscription. |
| Resource group | Select **TutorPubLBIP-rg**. |
| **Instance details** |  |
| Name | Enter **myLoadBalancer** |
| Region | Select **(US) East US**. |
| Type | Select **Public**. |
| SKU | Leave the default **Standard**. |
| Tier | Leave the default **Regional**. |

1. Select **Next: Frontend IP configuration** at the bottom of the page.
2. In **Frontend IP configuration**, select **+ Add a frontend IP**.
3. Enter **LoadBalancerFrontend** in **Name**.
4. Select **IPv4** or **IPv6** for the **IP version**.

**Note**

IPv6 isn't currently supported with Routing Preference or Cross-region load-balancing (Global Tier).

1. Select **IP address** for the **IP type**.

**Note**

For more information on IP prefixes, see [**Azure Public IP address prefix**](https://learn.microsoft.com/en-us/azure/virtual-network/ip-services/public-ip-address-prefix).

1. Select **Create new** in **Public IP address**.
2. In **Add a public IP address**, enter **myPublicIP** for **Name**.
3. Select **Zone-redundant** in **Availability zone**.

**Note**

In regions with [**Availability Zones**](https://learn.microsoft.com/en-us/azure/availability-zones/az-overview?toc=/azure/virtual-network/toc.json#availability-zones), you have the option to select no-zone (default option), a specific zone, or zone-redundant. The choice will depend on your specific domain failure requirements. In regions without Availability Zones, this field won't appear.  
For more information on availability zones, see [**Availability zones overview**](https://learn.microsoft.com/en-us/azure/availability-zones/az-overview).

1. Leave the default of **Microsoft Network** for **Routing preference**.
2. Select **OK**.
3. Select **Add**.
4. Select **Next: Backend pools** at the bottom of the page.
5. In the **Backend pools** tab, select **+ Add a backend pool**.
6. Enter **myBackendPool** for **Name** in **Add backend pool**.
7. Select **myVNet** in **Virtual network**.
8. Select **IP Address** for **Backend Pool Configuration**.
9. Select **IPv4** or **IPv6** for **IP version**.
10. Select **Add**.
11. Select the **Next: Inbound rules** button at the bottom of the page.
12. In **Load balancing rule** in the **Inbound rules** tab, select **+ Add a load balancing rule**.
13. In **Add load balancing rule**, enter or select the following information:

| **Setting** | **Value** |
| --- | --- |
| Name | Enter **myHTTPRule** |
| IP Version | Select **IPv4** or **IPv6** depending on your requirements. |
| Frontend IP address | Select **LoadBalancerFrontend**. |
| Protocol | Select **TCP**. |
| Port | Enter **80**. |
| Backend port | Enter **80**. |
| Backend pool | Select **myBackendPool**. |
| Health probe | Select **Create new**. In **Name**, enter **myHealthProbe**. Select **HTTP** in **Protocol**. Leave the rest of the defaults, and select **OK**. |
| Session persistence | Select **None**. |
| Idle timeout (minutes) | Enter or select **15**. |
| TCP reset | Select **Enabled**. |
| Floating IP | Select **Disabled**. |
| Outbound source network address translation (SNAT) | Leave the default of **(Recommended) Use outbound rules to provide backend pool members access to the internet.** |

1. Select **Add**.
2. Select the blue **Review + create** button at the bottom of the page.
3. Select **Create**.

**Note**

In this example we created a NAT gateway to provide outbound Internet access. The outbound rules tab in the configuration is bypassed as it's optional isn't needed with the NAT gateway. For more information on Azure NAT gateway, see [**What is Azure Virtual Network NAT?**](https://learn.microsoft.com/en-us/azure/virtual-network/nat-gateway/nat-overview) For more information about outbound connections in Azure, see [**Source Network Address Translation (SNAT) for outbound connections**](https://learn.microsoft.com/en-us/azure/load-balancer/load-balancer-outbound-connections)

**Create virtual machines**

In this section, you'll create two VMs (**myVM1** and **myVM2**) in two different zones (**Zone 1** and **Zone 2**).

These VMs are added to the backend pool of the load balancer that was created earlier.

1. On the upper-left side of the portal, select **Create a resource** > **Compute** > **Virtual machine**.
2. In **Create a virtual machine**, enter or select the values in the **Basics** tab:

| **Setting** | **Value** |
| --- | --- |
| **Project Details** |  |
| Subscription | Select your Azure subscription |
| Resource Group | Select **TutorPubLBIP-rg** |
| **Instance details** |  |
| Virtual machine name | Enter **myVM1** |
| Region | Select **(US) East US** |
| Availability Options | Select **Availability zones** |
| Availability zone | Select **1** |
| Image | Select **Windows Server 2019 Datacenter** |
| Azure Spot instance | Leave the default |
| Size | Choose VM size or take default setting |
| **Administrator account** |  |
| Username | Enter a username |
| Password | Enter a password |
| Confirm password | Reenter password |
| **Inbound port rules** |  |
| Public inbound ports | Select **None** |

1. Select the **Networking** tab, or select **Next: Disks**, then **Next: Networking**.
2. In the Networking tab, select or enter:

| **Setting** | **Value** |
| --- | --- |
| **Network interface** |  |
| Virtual network | **myVNet** |
| Subnet | **myBackendSubnet** |
| Public IP | Select **None**. |
| NIC network security group | Select **Advanced** |
| Configure network security group | Select **Create new**. In the **Create network security group**, enter **myNSG** in **Name**. Within **Inbound rules**, select **+Add an inbound rule**. Under **Service**, select **HTTP**. In **Priority**, enter **100**. Under **Name**, enter **myNSGRule** Select **Add** Select **OK** |
| **Load balancing** |  |
| Place this virtual machine behind an existing load-balancing solution? | Select the check box. |
| **Load balancing settings** |  |
| Load balancing options | Select **Azure load balancer** |
| Select a load balancer | Select **myLoadBalancer** |
| Select a backend pool | Select **myBackendPool** |

1. Select **Review + create**.
2. Review the settings, and then select **Create**.
3. Follow the steps 1 to 6 to create a VM with the following values and all the other settings the same as **myVM1**:

| **Setting** | **VM 2** |
| --- | --- |
| Name | **myVM2** |
| Availability zone | **2** |
| Network security group | Select the existing **myNSG** |

**Install IIS**

1. Select **All services** in the left-hand menu, select **All resources**, and then from the resources list, select **myVM1** that is located in the **TutorPubLBIP-rg** resource group.
2. On the **Overview** page, select **Connect**, then **Bastion**.
3. Select the **Use Bastion** button.
4. Enter the username and password entered during VM creation.
5. Select **Connect**.
6. On the server desktop, navigate to **Windows Administrative Tools** > **Windows PowerShell**.
7. In the PowerShell Window, run the following commands to:
   * Install the IIS server
   * Remove the default iisstart.htm file
   * Add a new iisstart.htm file that displays the name of the VM:

PowerShell

# Install IIS server role

Install-WindowsFeature -name Web-Server -IncludeManagementTools

# Remove default htm file

Remove-Item C:\inetpub\wwwroot\iisstart.htm

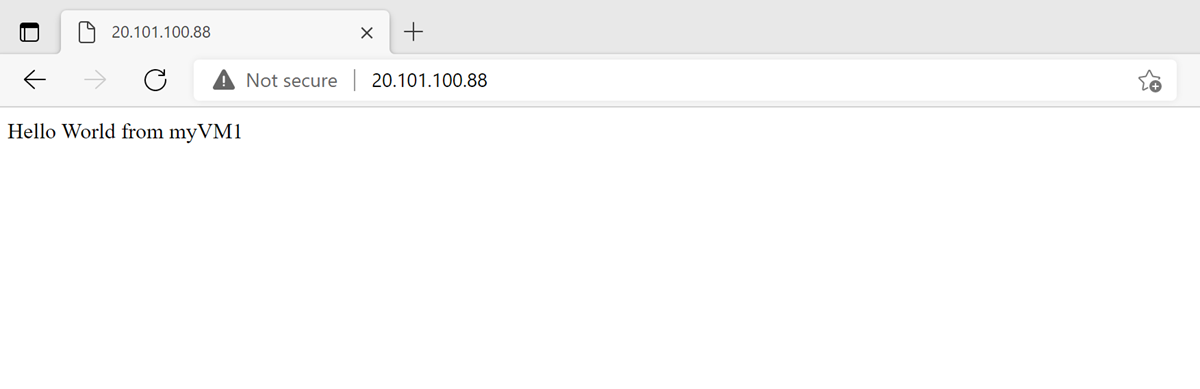
# Add a new htm file that displays server name

Add-Content -Path "C:\inetpub\wwwroot\iisstart.htm" -Value $("Hello World from " + $env:computername)

1. Close the Bastion session with **myVM1**.
2. Repeat steps 1 to 7 to install IIS and the updated iisstart.htm file on **myVM2**.

**Test the load balancer**

1. Find the public IP address for the load balancer on the **Overview** screen. Select **All services** in the left-hand menu, select **All resources**, and then select **myPublicIP-LB**.
2. Copy the public IP address, and then paste it into the address bar of your browser. The default page of IIS Web server is displayed on the browser.



To see the load balancer distribute traffic to myVM2, force-refresh your web browser from the client machine.

**Clean up resources**

If you're not going to continue to use this application, delete the virtual network, virtual machine, and NAT gateway with the following steps:

1. From the left-hand menu, select **Resource groups**.
2. Select the **TutorPubLBIP-rg** resource group.
3. Select **Delete resource group**.
4. Enter **TutorPubLBIP-rg** and select **Delete**.