Full Stack Application Development with Cloud Computing

Module 6 – Application Deployment and Management with Azure

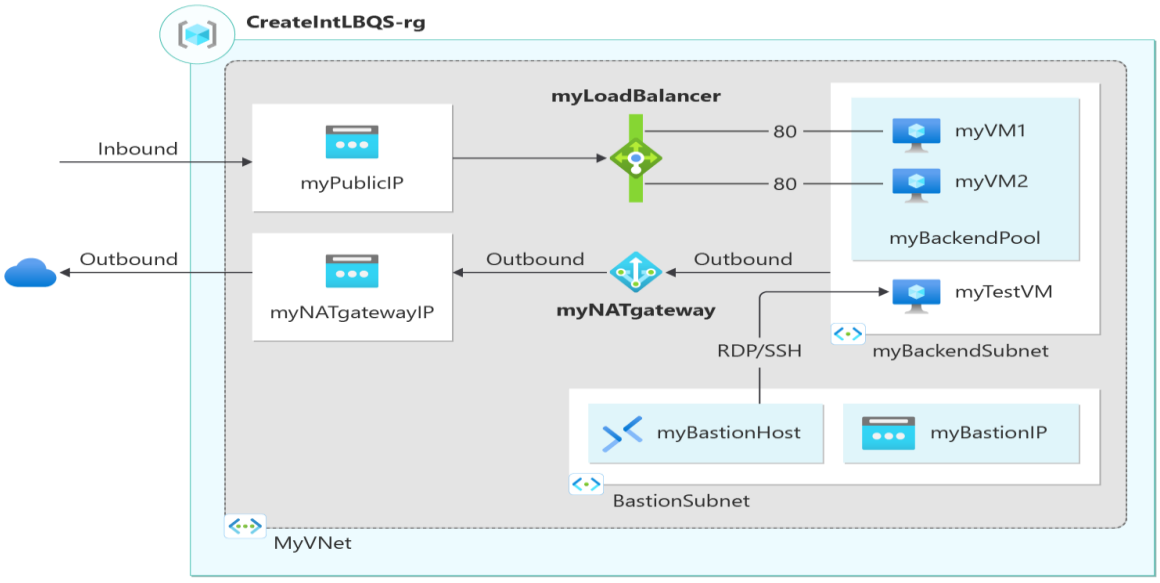
Lab Practical Manual

Topic: Load Balancer – Solved Question

Ex. 1: Create a public load balancer to load balance VMs using the Azure portal.

Create a public load balancer to load balance VMs using the Azure portal

Get started with Azure Load Balancer by using the Azure portal to create a public load balancer for a backend pool with two virtual machines. Additional resources include Azure Bastion, NAT Gateway, a virtual network, and the required subnets.



Create the virtual network

In this section, you'll create a virtual network, subnet, and Azure Bastion host. The virtual network and subnet contains the load balancer and virtual machines. The bastion host is used to securely manage the virtual machines and install IIS to test the load balancer.

1. In the search box at the top of the portal, enter **Virtual network**. Select **Virtual Networks** in the search results.
2. In **Virtual networks**, select **+ Create**.
3. In **Create virtual network**, enter or select the following information in the **Basics** tab:

Setting	Value
Project Details	
Subscription	Select your Azure subscription
Resource Group	Select **Createnew**. In **Name** enter **CreatePubLBQS-rg**. Select **OK**.
Instance details	
Name	Enter **myVNet**
Region	Select **East US**

4. Select the **Security** tab.
5. Under **Azure Bastion**, select **Enable Azure Bastion**. Enter this information:

Setting	Value
Azure Bastion name	Enter **myBastionHost**

6. Important

7. Hourly pricing starts from the moment Bastion is deployed, regardless of outbound data usage. For more information, see Pricing and SKUs. If you're deploying Bastion as part of a tutorial or test, we recommend that you delete this resource once you've finished using it.
8. Select the **IP addresses** tab or select the **Next: IP addresses** button at the bottom of the page.
9. In the **IP addresses** tab, select **Add an IP address space**, and enter this information:

Setting	Value
Starting Address	Enter **10.1.0.0**
Address space size	Select **/16**

10. Select **Add**.
11. Select **Add a subnet**, enter this information:

Setting	Value
Subnet name	Enter **myBackendSubnet**
Starting address	Enter **10.1.0.0**
Subnet size	Select **/24**

12. Select **Add**.
13. Select **Add a subnet**, enter this information:

Setting	Value
Subnet template	Azure Bastion
Starting address	Enter **10.1.1.0**
Subnet size	Select **/26**

14. Select **Add**.
15. Select the **Review + create** tab or select the **Review + create** button.
16. 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
- Health probe

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.

Setting	Value
Resource group	Select **CreatePubLBQS-rg**.
Instance details	
Name	Enter **myLoadBalancer**
Region	Select **East US**.
SKU	Leave the default **Standard**.
Type	Select **Public**.
Tier	Leave the default **Regional**.

4. Select **Next: Frontend IP configuration** at the bottom of the page.
5. In **Frontend IP configuration**, select **+ Add a frontend IP configuration**.
6. Enter **myFrontend** in **Name**.
7. Select **IPv4** for the **IP version**.
8. Select **IP address** for the **IP type**.
9. Select **Create new** in **Public IP address**.
10. In **Add a public IP address**, enter **myPublicIP** for **Name**.
11. Select **Zone-redundant** in **Availability zone**.
12. Leave the default of **Microsoft Network** for **Routing preference**.
13. Select **OK**.
14. Select **Add**.
15. Select **Next: Backend pools** at the bottom of the page.
16. In the **Backend pools** tab, select **+ Add a backend pool**.
17. Enter **myBackendPool** for **Name** in **Add backend pool**.
18. Select **myVNet** in **Virtual network**.
19. Select **IP Address** for **Backend Pool Configuration**.
20. Select **Save**.
21. Select **Next: Inbound rules** at the bottom of the page.
22. Under **Load balancing rule** in the **Inbound rules** tab, select **+ Add a load balancing rule**.
23. 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 **myFrontend (To be created)**.
Backend pool	Select **myBackendPool**.

Setting	Value
Protocol	Select **TCP**.
Port	Enter **80**.
Backend port	Enter **80**.
Health probe	Select **Createnew**. In **Name**,enter **myHealthProbe**. Select **TCP** 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**.
)utbound source network ldress translation (SNAT)	Leave the default of **(Recommended) Use outbound rules to provide backend pool members access to the internet.**

27. Select **Save**.
28. Select the blue **Review + create** button at the bottom of the page.
29. Select **Create**.

Note

In this example we'll create a NAT gateway to provide outbound Internet access. The outbound rules tab in the configuration is bypassed as it's optional and isn't needed with the NAT gateway. For more information on Azure NAT gateway, see What is Azure Virtual Network NAT? For more information about outbound connections in Azure, see Source Network Address Translation (SNAT) for outbound connections

Create NAT gateway

In this section, you'll create a NAT gateway for outbound internet access for resources in the virtual network. For other options for outbound rules, check out Network Address Translation (SNAT) for outbound connections.

1. In the search box at the top of the portal, enter **NAT gateway**. Select **NAT gateways** in the search results.
2. In **NAT gateways**, select **+ Create**.
3. In **Create network address translation (NAT) gateway**, enter or select the following information:

Setting	Value
Project details	
Subscription	Select your subscription.
Resource group	Select **CreatePubLBQS-rg**.
Instance details	
NAT gateway name	Enter **myNATgateway**.
Region	Select **East US**.
Availability zone	Select **None**.
Idle timeout (minutes)	Enter **15**.

4. Select the **Outbound IP** tab or select **Next: Outbound IP** at the bottom of the page.
5. In **Outbound IP**, select **Create a new public IP address** next to **Public IP addresses**.
6. Enter **myNATgatewayIP** in **Name**.
7. Select **OK**.
8. Select the **Subnet** tab or select the **Next: Subnet** button at the bottom of the page.
9. In **Virtual network** in the **Subnet** tab, select **myVNet**.
10. Select **myBackendSubnet** under **Subnet name**.
11. Select the blue **Review + create** button at the bottom of the page, or select the **Review + create** tab.
12. Select **Create**.

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. In the search box at the top of the portal, enter **Virtual machine**. Select **Virtual machines** in the search results.
2. In **Virtual machines**, select **+ Create** > **Azure virtual machine**.
3. In **Create a virtual machine**, enter or select the following values in the **Basics** tab:

Setting	Value
Project Details	
Subscription	Select your Azure subscription

Setting	Value
Resource Group	Select **CreatePubLBQS-rg**
nstance details	
Virtual machine name	Enter **myVM1**
Region	Select **((US) East US)**
vailability Options	Select **Availability zones**
Availability zone	Select **Zone 1**
Security type	Select **Standard**.
Image	elect **Windows Server 2022 Datacenter: Azure Edition - Gen2**
zure Spot instance	Leave the default of unchecked.
Size	Choose VM size or take default setting
Administrator account	
Username	Enter a username
Password	Enter a password
Confirm password	Reenter password
bound port rules	
ıblic inbound ports	Select **None**

4. Select the **Networking** tab, or select **Next: Disks**, then **Next: Networking**.
5. In the Networking tab, select or enter the following information:

Setting	Value
etwork interface	
Virtual network	Select **myVNet**
Subnet	Select **myBackendSubnet**
Public IP	Select **None**.

Setting	Value
C network security group	Select **Advanced**
onfigure network security group	Skip this setting until the rest of the settings are completed. Complete after **Select a backend pool**.
lete NIC when VM is deleted	Leave the default of **unselected**.
Accelerated networking	Leave the default of **selected**.
Load balancing	
Load balancing options	
Load-balancing options	Select **Azure load balancer**
Select a load balancer	Select **myLoadBalancer**
Select a backend pool	Select **myBackendPool**
onfigure network security group	Select **Create new**. In the **Create network security group**, enter **myNSG** in **Name**. Under **Inbound rules**, select **+Add an inbound rule**. Under **Service**, select **HTTP**. Under **Priority**, enter **100**. In **Name**, enter **myNSGRule** Select **Add** Select **OK**

6. Select **Review + create**.
7. Review the settings, and then select **Create**.
8. Follow the steps 1 through 7 to create another VM with the following values and all the other settings the same as **myVM1**:

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

Install IIS

1. In the search box at the top of the portal, enter **Virtual machine**. Select **Virtual machines** in the search results.
2. Select **myVM1**.
3. On the **Overview** page, select **Connect**, then **Bastion**.
4. Enter the username and password entered during VM creation.
5. Select **Connect**.
6. On the server desktop, navigate to **Start** > **Windows PowerShell** > **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:

PowerShellCopy

```
# 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)
```

8. Close the Bastion session with **myVM1**.
9. Repeat steps 1 to 8 to install IIS and the updated iisstart.htm file on **myVM2**.

Test the load balancer

1. In the search box at the top of the page, enter **Public IP**. Select **Public IP addresses** in the search results.
2. In **Public IP addresses**, select **myPublicIP**.
3. Copy the item in **IP address**. Paste the public IP into the address bar of your browser. The custom VM page of the IIS Web server is displayed in the browser.

Clean up resources

When no longer needed, delete the resource group, load balancer, and all related resources. To do so, select the resource group **CreatePubLBQS-rg** that contains the resources and then select **Delete**.