


Assignment: Setting Up Internal and External Load Balancers in Azure (Windows Environment)

1. Resource Group and Virtual Network Setup


Step 1.1: Create a Resource Group

```
az group create --name MyResourceGroup --location eastus
```

 *Explanation:* Resource groups act as containers for Azure resources, allowing easy management.

Step 1.2: Create a Virtual Network and Subnet

```
az network vnet create \  
  --resource-group MyResourceGroup \  
  --name MyVNet \  
  --address-prefix 10.0.0.0/16 \  
  --subnet-name MySubnet \  
  --subnet-prefix 10.0.1.0/24
```


 *Explanation:* Virtual Network (VNet) allows secure communication between resources; subnet is a segmented part of it.

2. Create Windows Virtual Machines (Backends)

Step 2.1: Create two Windows VMs

```
az vm create \  
  --resource-group MyResourceGroup \  
  --name VM1 \  
  --vnet-name MyVNet \  
  --subnet MySubnet \  
  --image Win2019Datacenter \  
  --admin-username azureuser \  
  --admin-password Password123! \  
  --nsg-rule RDP  
  
az vm create \  
  --resource-group MyResourceGroup \  
  --name VM2 \  
  --vnet-name MyVNet \  
  --subnet MySubnet \  
  --image Win2019Datacenter \  
  --admin-username azureuser \
```

```
--admin-password Password123! \  
--nsg-rule RDP
```

 *Explanation:* These commands deploy two Windows Server VMs with Remote Desktop access enabled.

Step 2.2: Install IIS on both VMs (use Run Command or PowerShell)

```
Install-WindowsFeature -name Web-Server -IncludeManagementTools  
Add-Content -Path "C:\\inetpub\\wwwroot\\index.html" -Value  
"Served by VM1 or VM2"
```

 *Explanation:* IIS is installed to serve simple web pages for verifying load balancing.

3. Create an External Load Balancer

Step 3.1: Create a Public IP

```
az network public-ip create \  
--resource-group MyResourceGroup \  
--name MyPublicIP \  
--sku Standard \  
--allocation-method Static
```

Step 3.2: Create Load Balancer with Public Frontend

```
az network lb create \  
--resource-group MyResourceGroup \  
--name MyExternalLB \  
--sku Standard \  
--public-ip-address MyPublicIP \  
--frontend-ip-name MyFrontEnd \  
--backend-pool-name MyBackEndPool
```

Step 3.3: Add Backend Pool Members

```
az network nic ip-config address-pool add \  
--address-pool MyBackEndPool \  
--ip-config-name ipconfig1 \  
--nic-name VM1VMNic \  
--resource-group MyResourceGroup \  
--lb-name MyExternalLB \  
--backend-pool-name MyBackEndPool
```


(Repeat for VM2)

Step 3.4: Create Health Probe

```
az network lb probe create \  
  --resource-group MyResourceGroup \  
  --lb-name MyExternalLB \  
  --name MyHealthProbe \  
  --protocol tcp \  
  --port 80
```

Step 3.5: Create Load Balancing Rule

```
az network lb rule create \  
  --resource-group MyResourceGroup \  
  --lb-name MyExternalLB \  
  --name MyHTTPRule \  
  --protocol tcp \  
  --frontend-port 80 \  
  --backend-port 80 \  
  --frontend-ip-name MyFrontEnd \  
  --backend-pool-name MyBackEndPool \  
  --probe-name MyHealthProbe
```

 *Explanation:* An external load balancer distributes internet traffic across multiple VMs based on the load-balancing rule and probe.


4. Create an Internal Load Balancer

Step 4.1: Create Internal Load Balancer

```
az network lb create \  
  --resource-group MyResourceGroup \  
  --name MyInternalLB \  
  --sku Standard \  
  --frontend-ip-name MyInternalFrontEnd \  
  --backend-pool-name MyInternalBackEndPool \  
  --vnet-name MyVNet \  
  --subnet MySubnet \  
  --private-ip-address 10.0.1.100 \  
  --frontend-ip-configs subnet=MySubnet
```

Step 4.2: Add Backend Pool Members (repeat external steps)

Step 4.3: Create Health Probe and Load Balancing Rule (same process as above)

 *Explanation:* Internal load balancers handle traffic within the virtual network (VNet) only.

5. Verification Steps

Step 5.1: External LB

- Open browser or use:

```
curl http://<Public-IP>
```

- You should see responses from VM1 and VM2 alternately.

Step 5.2: Internal LB

- RDP into another VM within the same VNet.
- Run:

```
curl http://10.0.1.100
```

- Confirm alternating responses from backend VMs.

Challenges Faced:

- VM NIC names had to be retrieved manually.
- Ensuring correct subnet and NSG rules for communication.
- IIS installation required admin permissions.

6. Conclusion

This assignment guided the setup of both internal and external load balancers in Azure. The process included VM provisioning, web server setup, health probing, backend pool configuration, and rule creation. Verification proved the round-robin distribution of requests.

What I Learned:

- The difference between internal and external load balancers.
- Importance of NSG, probes, and backend pools.
- Effective use of Azure CLI for infrastructure deployment.

End of Assignment