

Assignment week 5

Create three subnets: 1. Web tier 2. App tier 3. DB tier DB Tier should not access any tier (Web & App tier) App tier should access the DB tier and Web tier as well, Web tier should access only App tier. Only Web tier is allowed to connect to the internet. Deploy two VM's in each tier(One VM should be Linux & another should be Windows). Configure Apache Server on Linux VM's And IIS Server on Windows.

Solution:

Step 1: Create a Resource Group

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

Step 2: Create a Virtual Network and Subnets

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

```
az network vnet subnet create \  
  --resource-group MyResourceGroup \  
  --vnet-name MyVNet \  
  --name AppTierSubnet \  
  --address-prefix 10.0.2.0/24
```

```
az network vnet subnet create \  
  --resource-group MyResourceGroup \  
  --vnet-name MyVNet \  
  --name DBTierSubnet \  
  --address-prefix 10.0.3.0/24
```

Step 3: Create Network Security Groups

```
az network nsg create \  
  --resource-group MyResourceGroup \  
  --name WebTierNSG
```

```
az network nsg create \  
  --resource-group MyResourceGroup \  
  --name AppTierNSG
```

```
az network nsg create \  
  --resource-group MyResourceGroup \  
  --name DBTierNSG
```

Step 4: Configure NSG Rules

Web Tier NSG Rules:

```
az network nsg rule create \  
  --resource-group MyResourceGroup \  
  --nsg-name WebTierNSG \  
  --name AllowWebTraffic \  
  --priority 1000 \  
  --source-address-prefix '*' \  
  --source-port-ranges '*' \  
  --destination-address-prefix '*' \  
  --destination-port-ranges 80 443 \  
  --access Allow \  
  --protocol Tcp \  
  --direction Inbound
```

```
az network nsg rule create \  
  --resource-group MyResourceGroup \  
  --nsg-name WebTierNSG \  
  --name AllowAppTraffic \  
  --priority 2000 \  
  --source-address-prefix 10.0.2.0/24 \  
  --source-port-ranges '*' \  
  --destination-address-prefix '*' \  
  --destination-port-ranges '*' \  
  --access Allow \  
  --protocol '*' \  
  --direction Inbound
```

```
az network nsg rule create \  
  --resource-group MyResourceGroup \  
  --nsg-name WebTierNSG \  
  --name AllowOutboundToAppAndInternet \  
  --priority 3000 \  
  --source-address-prefix '*' \  
  --source-port-ranges '*' \  
  --destination-address-prefixes 10.0.2.0/24 0.0.0.0/0 \  
  --destination-port-ranges '*' \  
  --access Allow \  
  --protocol '*' \  
  --direction Outbound
```

App Tier NSG Rules:

```
az network nsg rule create \  
  --resource-group MyResourceGroup \  
  --nsg-name WebTierNSG \  
  --name AllowAppTraffic \  
  --priority 2000 \  
  --source-address-prefix 10.0.2.0/24 \  
  --source-port-ranges '*' \  
  --destination-address-prefix '*' \  
  --destination-port-ranges '*' \  
  --access Allow \  
  --protocol '*' \  
  --direction Inbound
```

```
--resource-group MyResourceGroup \  
--nsg-name AppTierNSG \  
--name AllowWebTierTraffic \  
--priority 1000 \  
--source-address-prefix 10.0.1.0/24 \  
--source-port-ranges '*' \  
--destination-address-prefix '*' \  
--destination-port-ranges '*' \  
--access Allow \  
--protocol '*' \  
--direction Inbound
```

```
az network nsg rule create \  
--resource-group MyResourceGroup \  
--nsg-name AppTierNSG \  
--name AllowDBTierTraffic \  
--priority 2000 \  
--source-address-prefix 10.0.3.0/24 \  
--source-port-ranges '*' \  
--destination-address-prefix '*' \  
--destination-port-ranges '*' \  
--access Allow \  
--protocol '*' \  
--direction Inbound
```

```
az network nsg rule create \  
--resource-group MyResourceGroup \  
--nsg-name AppTierNSG \  
--name AllowOutboundToWebAndDB \  

```

```
--priority 3000 \  
--source-address-prefix '*' \  
--source-port-ranges '*' \  
--destination-address-prefixes 10.0.1.0/24 10.0.3.0/24 \  
--destination-port-ranges '*' \  
--access Allow \  
--protocol '*' \  
--direction Outbound
```

DB Tier NSG Rules:

```
az network nsg rule create \  
  --resource-group MyResourceGroup \  
  --nsg-name DBTierNSG \  
  --name AllowAppTierTraffic \  
  --priority 1000 \  
  --source-address-prefix 10.0.2.0/24 \  
  --source-port-ranges '*' \  
  --destination-address-prefix '*' \  
  --destination-port-ranges '*' \  
  --access Allow \  
  --protocol '*' \  
  --direction Inbound
```

```
az network nsg rule create \  
  --resource-group MyResourceGroup \  
  --nsg-name DBTierNSG \  
  --name AllowOutboundToApp \  
  --priority 2000 \  
  --source-address-prefix '*'
```

```
--source-port-ranges '*' \  
--destination-address-prefix 10.0.2.0/24 \  
--destination-port-ranges '*' \  
--access Allow \  
--protocol '*' \  
--direction Outbound
```

Step 5: Associate NSGs with Subnets

```
az network vnet subnet update \  
  --resource-group MyResourceGroup \  
  --vnet-name MyVNet \  
  --name WebTierSubnet \  
  --network-security-group WebTierNSG
```

```
az network vnet subnet update \  
  --resource-group MyResourceGroup \  
  --vnet-name MyVNet \  
  --name AppTierSubnet \  
  --network-security-group AppTierNSG
```

```
az network vnet subnet update \  
  --resource-group MyResourceGroup \  
  --vnet-name MyVNet \  
  --name DBTierSubnet \  
  --network-security-group DBTierNSG
```

Step 6: Deploy Virtual Machines

Web Tier VMs:

```
az vm create \  
  --resource-group MyResourceGroup \  
  --name WebTierVM
```

```
--name WebLinuxVM \  
--image UbuntuLTS \  
--admin-username azureuser \  
--admin-password 'YourPassword123!' \  
--vnet-name MyVNet \  
--subnet WebTierSubnet \  
--nsg WebTierNSG \  
--public-ip-sku Standard \  
--size Standard_B1s
```

```
az vm create \  
--resource-group MyResourceGroup \  
--name WebWindowsVM \  
--image Win2019Datacenter \  
--admin-username azureuser \  
--admin-password 'YourPassword123!' \  
--vnet-name MyVNet \  
--subnet WebTierSubnet \  
--nsg WebTierNSG \  
--public-ip-sku Standard \  
--size Standard_B1s
```

App Tier VMs:

```
az vm create \  
--resource-group MyResourceGroup \  
--name AppLinuxVM \  
--image UbuntuLTS \  
--admin-username azureuser \  
--admin-password 'YourPassword123!' \  

```

```
--vnet-name MyVNet \  
--subnet AppTierSubnet \  
--nsg AppTierNSG \  
--public-ip-sku Standard \  
--size Standard_B1s
```

```
az vm create \  
--resource-group MyResourceGroup \  
--name AppWindowsVM \  
--image Win2019Datacenter \  
--admin-username azureuser \  
--admin-password 'YourPassword123!' \  
--vnet-name MyVNet \  
--subnet AppTierSubnet \  
--nsg AppTierNSG \  
--public-ip-sku Standard \  
--size Standard_B1s
```

DB Tier VMs:

```
az vm create \  
--resource-group MyResourceGroup \  
--name DBLinuxVM \  
--image UbuntuLTS \  
--admin-username azureuser \  
--admin-password 'YourPassword123!' \  
--vnet-name MyVNet \  
--subnet DBTierSubnet \  
--nsg DBTierNSG \  
--public-ip-sku Standard \  
--size Standard_B1s
```



```
--size Standard_B1s
```

```
az vm create \  
  --resource-group MyResourceGroup \  
  --name DBWindowsVM \  
  --image Win2019Datacenter \  
  --admin-username azureuser \  
  --admin-password 'YourPassword123!' \  
  --vnet-name MyVNet \  
  --subnet DBTierSubnet \  
  --nsg DBTierNSG \  
  --public-ip-sku Standard \  
  --size Standard_B1s
```

Step 7: Configure VMs

Linux VMs (Install Apache):

1.Connect to the Linux VM:

```
ssh azureuser@<PublicIP>
```

2.Install Apache:

```
sudo apt update
```

```
sudo apt install apache2 -y
```

```
sudo systemctl start apache2
```

```
sudo systemctl enable apache2
```

Windows VMs (Install IIS):

1. Connect to the Windows VM via RDP.
2. Open PowerShell as Administrator.
3. Install IIS:

`Install-WindowsFeature -name Web-Server -IncludeManagementTools`

Summary

- Created a VNet with three subnets.
- Configured NSGs to control traffic flow between subnets and the internet.
- Deployed two VMs (one Linux, one Windows) in each subnet.
- Installed Apache on Linux VMs and IIS on Windows VMs using Azure CLI.