Tutorial: Filter network traffic with a network security group using the Azure Portal

Customers can filter network traffic inbound to and outbound from a virtual network subnet with a network security group. Network security groups contain security rules that filter network traffic by IP address, port, and protocol. Security rules are applied to resources deployed in a subnet. In this tutorial, you learn how to:

- Create a network security group and security rules
- Create a virtual network and associate a network security group to a subnet
- Deploy virtual machines (VM) into a subnet
- Test traffic filters

Log in to Azure

Log in to the Azure portal at https://portal.azure.com.

Create a virtual network

1. Select **+ Create a resource** on the upper, left corner of the Azure portal.
2. Select **Networking**, and then select **Virtual network**.
3. Enter, or select, the following information, accept the defaults for the remaining settings, and then select **Create**:

Setting	**Value**
Name	myVirtualNetwork
Address space	10.0.0.0/16
Subscription	Select your subscription.
Resource group	Select **Create new** and enter *myResourceGroup*.
Location	Select **East US**.
Subnet- Name	mySubnet

Setting	Value
Subnet - Address range	10.0.0.0/24

Create application security groups

An application security group enables you to group together servers with similar functions, such as web servers.

1. Select **+ Create a resource** on the upper, left corner of the Azure portal.
2. In the **Search the Marketplace** box, enter *Application security group*. When **Application security group** appears in the search results, select it, select **Application security group** again under **Everything**, and then select **Create**.
3. Enter, or select, the following information, and then select **Create**:

Setting	Value
Name	myAsgWebServers
Subscription	Select your subscription.
Resource group	Select **Use existing** and then select **myResourceGroup**.
Location	East US

4. Complete step 3 again, specifying the following values:

Setting	Value
Name	myAsgMgmtServers
Subscription	Select your subscription.
Resource group	Select **Use existing** and then select **myResourceGroup**.
Location	East US

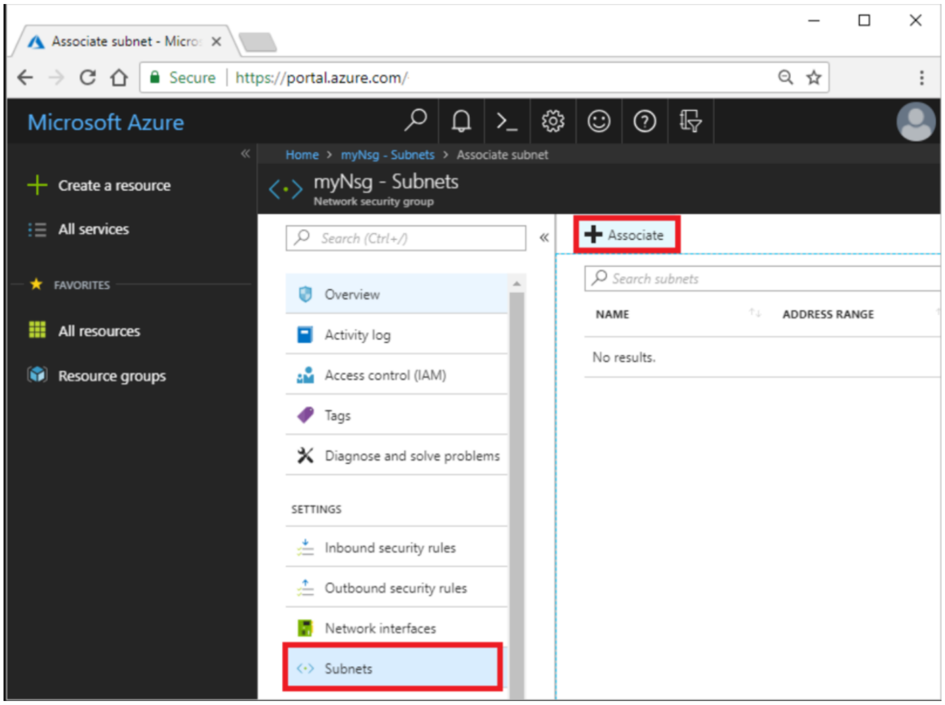
Create a network security group

1. Select **+ Create a resource** on the upper, left corner of the Azure portal.
2. Select **Networking**, and then select **Network security group**.
3. Enter, or select, the following information, and then select **Create**:

Setting	Value
Name	myNsg
Subscription	Select your subscription.
Resource group	Select **Use existing** and then select *myResourceGroup*.
Location	East US

Associate network security group to subnet

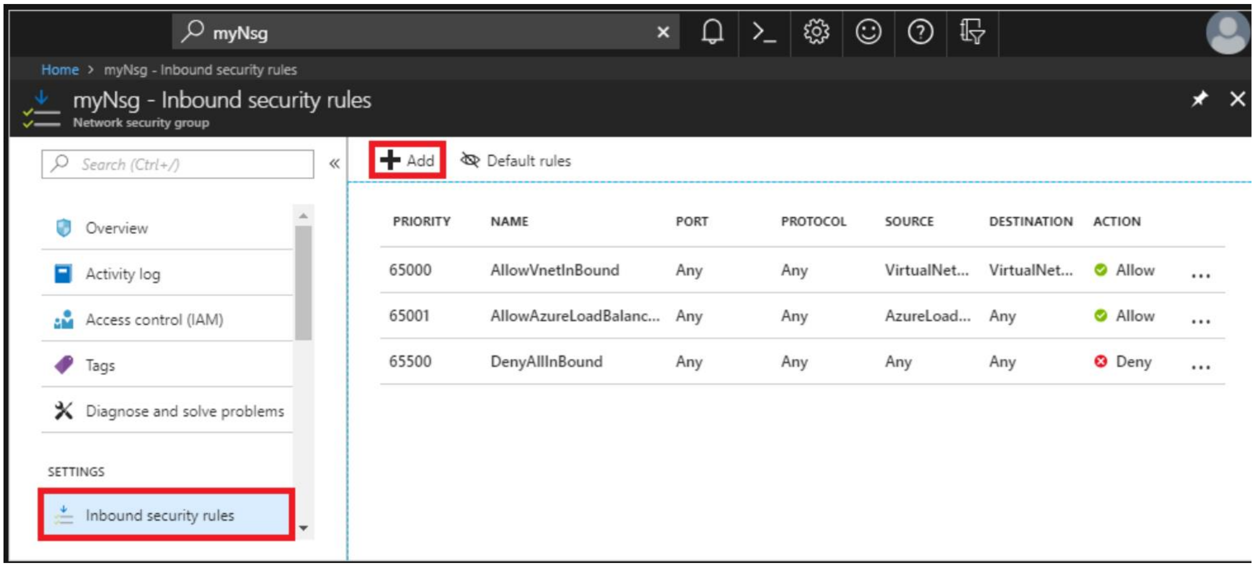
1. In the *Search resources, services, and docs* box at the top of the portal, begin typing *myNsg*. When **myNsg** appears in the search results, select it.
2. Under **SETTINGS**, select **Subnets** and then select **+ Associate**, as shown in the following picture:



3. Under **Associate subnet**, select **Virtual network** and then select **myVirtualNetwork**. Select **Subnet**, select **mySubnet**, and then select **OK**.

Create security rules

1. Under **SETTINGS**, select **Inbound security rules** and then select **+ Add**, as shown in the following picture:



PRIORITY	NAME	PORT	PROTOCOL	SOURCE	DESTINATION	ACTION
65000	AllowVnetInBound	Any	Any	VirtualNet...	VirtualNet...	✓ Allow
65001	AllowAzureLoadBalanc...	Any	Any	AzureLoad...	Any	✓ Allow
65500	DenyAllInBound	Any	Any	Any	Any	✕ Deny

2. Create a security rule that allows ports 80 and 443 to the **myAsgWebServers** application security group. Under **Add inbound security rule**, enter, or select the following values, accept the remaining defaults, and then select **Add**:

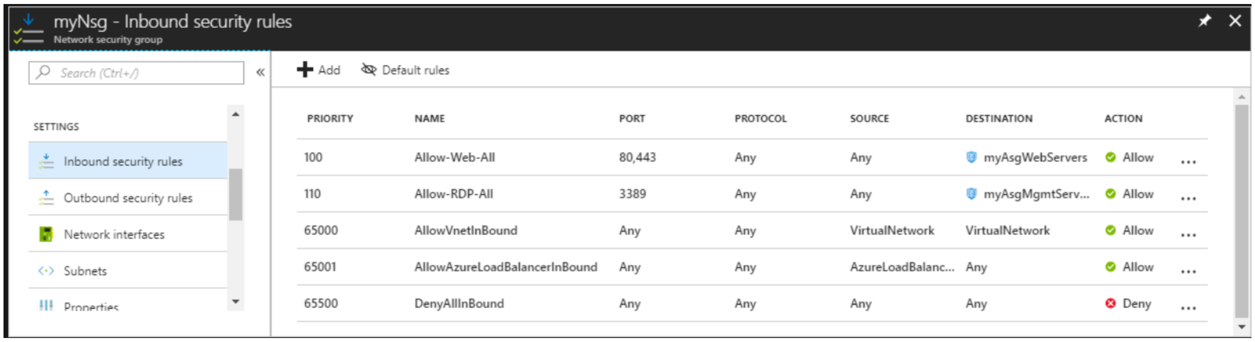
Setting	Value
Destination	Select **Application security group**, and then select **myAsgWebServers** for **Application security group**.
Destination port ranges	Enter 80,443
Protocol	Select TCP
Name	Allow-Web-All

3. Complete step 2 again, using the following values:

Setting	**Value**
Destination	Select **Application security group**, and then select **myAsgMgmtServers** for **Application security group**.
Destination port ranges	Enter 3389
Protocol	Select TCP
Priority	Enter 110
Name	Allow-RDP-All

4. In this tutorial, RDP (port 3389) is exposed to the internet for the VM that is assigned to the *myAsgMgmtServers*application security group. For production environments, instead of exposing port 3389 to the internet, it's recommended that you connect to Azure resources that you want to manage using a VPN or private network connection.

Once you've completed steps 1-3, review the rules you created. Your list should look like the list in the following picture:



PRIORITY	NAME	PORT	PROTOCOL	SOURCE	DESTINATION	ACTION
100	Allow-Web-All	80,443	Any	Any	myAsgWebServers	✓ Allow
110	Allow-RDP-All	3389	Any	Any	myAsgMgmtServ...	✓ Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	✓ Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalanc...	Any	✓ Allow
65500	DenyAllInBound	Any	Any	Any	Any	✕ Deny

Create virtual machines

Create two VMs in the virtual network.

Create the first VM

1. Select **+ Create a resource** found on the upper, left corner of the Azure portal.
2. Select **Compute**, and then select **Windows Server 2016 Datacenter**.
3. Enter, or select, the following information, accept the defaults for the remaining settings, and then select **OK**:

Setting	Value
Name	myVmWeb
User name	Enter a user name of your choosing.
Password	Enter a password of your choosing. The password must be at least 12 characters long and meet the defined complexity requirements.
Subscription	Select your subscription.
Resource group	Select **Use existing** and select **myResourceGroup**.
Location	Select **East US**

4. Select a size for the VM and then select **Select**.
5. Under **Settings**, select the following values, accept the remaining defaults, and then select **OK**:

Setting	Value
Virtual network	Select **myVirtualNetwork**
Network Security Group	Select **Advanced**.
Network security group (firewall)	Select **(new) myVmWeb-nsg**, and then under **Choose network security group**, select **None**.

6. Under **Create** of the **Summary**, select **Create** to start VM deployment.

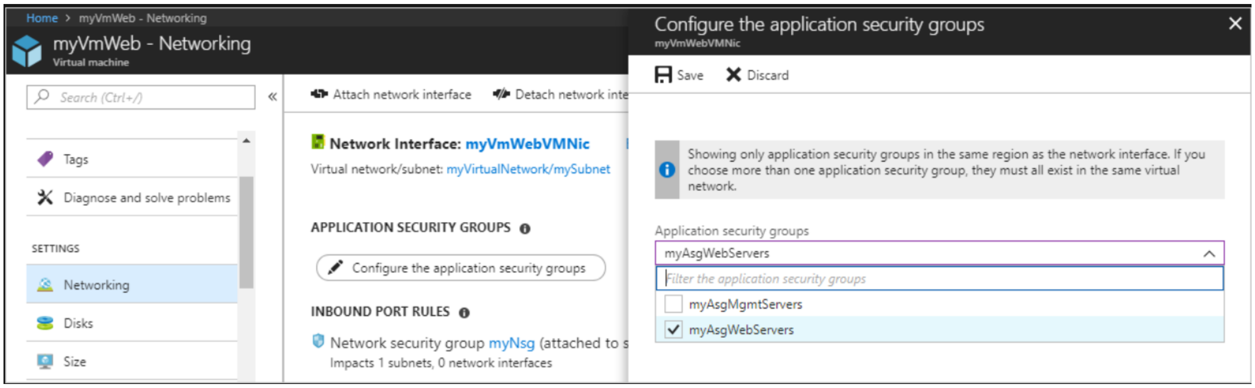
Create the second VM

Complete steps 1-6 again, but in step 3, name the VM *myVmMgmt*. The VM takes a few minutes to deploy. Do not continue to the next step until the VM is deployed.

Associate network interfaces to an ASG

When the portal created the VMs, it created a network interface for each VM, and attached the network interface to the VM. Add the network interface for each VM to one of the application security groups you created previously:

1. In the *Search resources, services, and docs* box at the top of the portal, begin typing *myVmWeb*. When the **myVmWeb** VM appears in the search results, select it.
2. Under **SETTINGS**, select **Networking**. Select **Configure the application security groups**, select **myAsgWebServers** for **Application security groups**, and then select **Save**, as shown in the following picture:


Home > myVmWeb - Networking
myVmWeb - Networking
Virtual machine
Search (Ctrl+/)
Tags
Diagnose and solve problems
SETTINGS
Networking
Disks
Size
Attach network interface
Detach network inte
APPLICATION SECURITY GROUPS
Configure the application security groups
INBOUND PORT RULES
Configure the application security groups
Save
Discard
Filter the application security groups

Network Interface: myVmWebVMNic

Virtual network/subnet: myVirtualNetwork/mySubnet

Network security group myNsg (attached to s

Impacts 1 subnets, 0 network interfaces

myVmWebVMNic

Showing only application security groups in the same region as the network interface. If you choose more than one application security group, they must all exist in the same virtual network.

Application security groups: myAsgWebServers

☐ myAsgMgmtServers

☑ myAsgWebServers

3. Complete steps 1 and 2 again, searching for the **myVmMgmt** VM and selecting the **myAsgMgmtServers** ASG.

Test traffic filters

1. Connect to the *myVmMgmt* VM. Enter *myVmMgmt* in the search box at the top of the portal. When **myVmMgmt** appears in the search results, select it. Select the **Connect** button.
2. Select **Download RDP file**.
3. Open the downloaded rdp file and select **Connect**. Enter the user name and password you specified when creating the VM. You may need to select **More choices**, then **Use a different account**, to specify the credentials you entered when you created the VM.
4. Select **OK**.

5. You may receive a certificate warning during the sign-in process. If you receive the warning, select **Yes** or **Continue**, to proceed with the connection.

   The connection succeeds, because port 3389 is allowed inbound from the internet to the *myAsgMgmtServers* application security group that the network interface attached to the *myVmMgmt* VM is in.

6. Connect to the *myVmWeb* VM from the *myVmMgmt* VM by entering the following command in a PowerShell session:

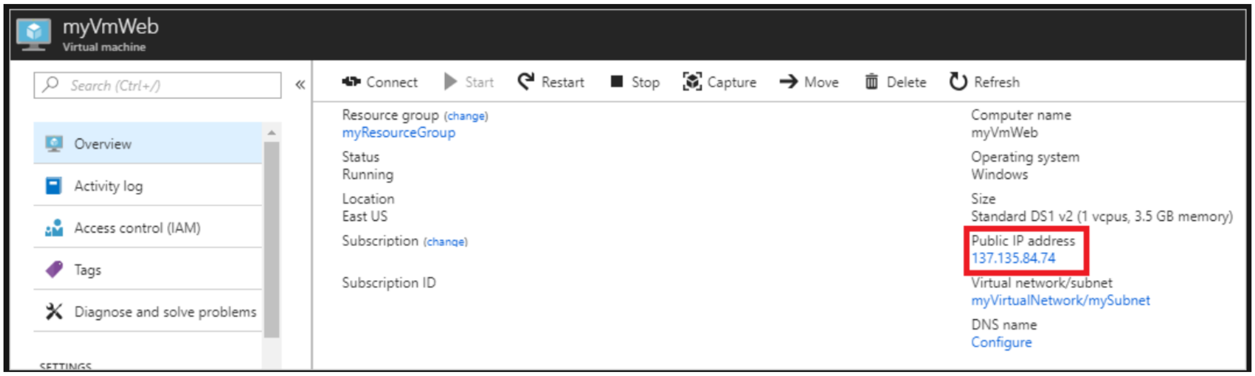
   ```
   mstsc /v:myVmWeb
   ```

   You are able to connect to the myVmWeb VM from the myVmMgmt VM because VMs in the same virtual network can communicate with each other over any port, by default. You can't however, create a remote desktop connection to the *myVmWeb* VM from the internet, because the security rule for the *myAsgWebServers* doesn't allow port 3389 inbound from the internet and inbound traffic from the Internet is denied to all resources, by default.

7. To install Microsoft IIS on the *myVmWeb* VM, enter the following command from a PowerShell session on the *myVmWeb*VM:

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

8. After the IIS installation is complete, disconnect from the *myVmWeb* VM, which leaves you in the *myVmMgmt* VM remote desktop connection.
9. Disconnect from the *myVmMgmt* VM.
10. In the *Search resources, services, and docs* box at the top of the Azure portal, begin typing *myVmWeb* from your computer. When **myVmWeb** appears in the search results, select it. Note the **Public IP address** for your VM. The address shown in the following picture is 137.135.84.74, but your address is different:



Resource group (change)
myResourceGroup

Status
Running

Location
East US

Subscription (change)

Subscription ID

Computer name
myVmWeb

Operating system
Windows

Size
Standard DS1 v2 (1 vcpus, 3.5 GB memory)

Public IP address
137.135.84.74

Virtual network/subnet
myVirtualNetwork/mySubnet

DNS name
Configure

11. To confirm that you can access the *myVmWeb* web server from the internet, open an internet browser on your computer and browse to `http://<public-ip-address-from-previous-step>`. You see the IIS welcome screen, because port 80 is allowed inbound from the internet to the *myAsgWebServers* application security group that the network interface attached to the *myVmWeb* VM is in.

Clean up resources

When no longer needed, delete the resource group and all of the resources it contains:

1. Enter *myResourceGroup* in the **Search** box at the top of the portal. When you see **myResourceGroup** in the search results, select it.
2. Select **Delete resource group**.
3. Enter *myResourceGroup* for **TYPE THE RESOURCE GROUP NAME:** and select **Delete**.