Exercise - Configure network access

In this exercise, you configure the access to the virtual machine (VM) you created earlier in this module.

Important

You have your virtual machine is running created in the previous Lab. If it is not, you'll need to redo the previous exercise (**Exercise - Create an Azure virtual machine**).

To verify the VM you created previously is still running, use the following command in the Azure cloud shell:

```
az vm list
```

If you receive an empty response [], you need to complete the (**Exercise - Create an Azure virtual machine)** again. If the result lists your current VM and its settings, you may continue.

Right now, the VM you created and installed Nginx on isn't accessible from the internet. You create a network security group that changes that by allowing inbound HTTP access on port 80.

Task 1: Access your web server

In this procedure, you get the IP address for your VM and attempt to access your web server's home page.

1. Run the following az vm list-ip-addresses command to get your VM's IP address and store the result as a Bash variable:

   ```
   IPADDRESS="$(az vm list-ip-addresses \
     --resource-group "[resource group name]" \
     --name my-vm \
     --query "[].virtualMachine.network.publicIpAddresses[*].ipAddress" \
     --output tsv)"
   ```

2. Run the following curl command to download the home page:

   ```
   curl --connect-timeout 5 http://$IPADDRESS
   ```

   The --connect-timeout argument specifies to allow up to five seconds for the connection to occur. After five seconds, you see an error message that states that the connection timed out:

   The output of the above command will be

   ```
   curl: (28) Connection timed out after 5001 milliseconds
   ```

   This message means that the VM wasn't accessible within the timeout period.

3. As an optional step, try to access the web server from a browser:

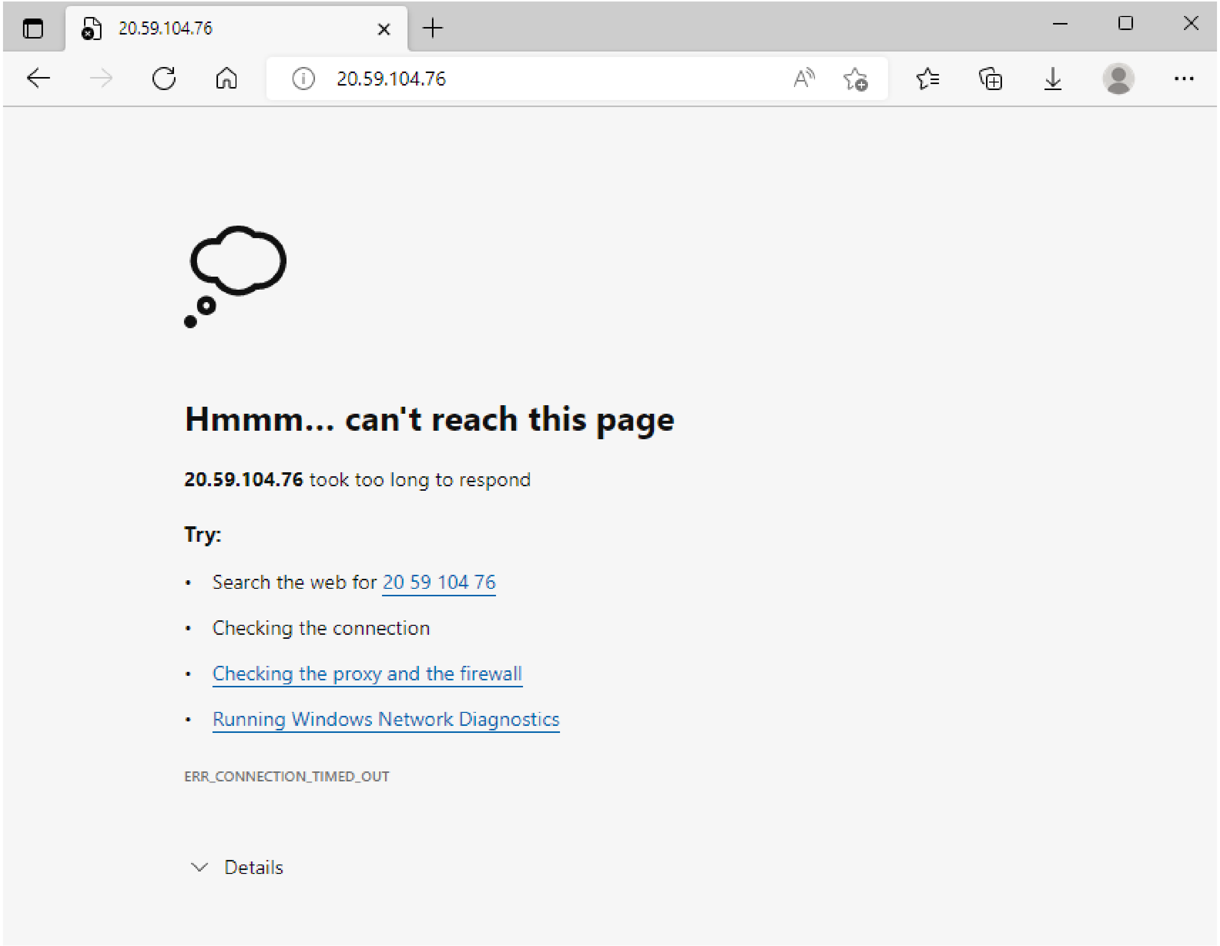
   a. Run the following to print your VM's IP address to the console:

      ```
      echo $IPADDRESS
      ```

      You see an IP address, for example, *23.102.42.235*.

      Copy the IP address that you see to the clipboard.

b. Open a new browser tab and go to your web server. After a few moments, you see that the connection isn't happening. If you wait for the browser to time out, you see something like this:



Hmmm... can't reach this page

20.59.104.76 took too long to respond

Try:

- Search the web for 20 59 104 76
- Checking the connection
- Checking the proxy and the firewall
- Running Windows Network Diagnostics

ERR_CONNECTION_TIMED_OUT

c. Keep this browser tab open for later.

Task 2: List the current network security group rules

Your web server wasn't accessible. To find out why, let's examine your current NSG rules.

1. Run the following az network nsg list command to list the network security groups that are associated with your VM:

```
az network nsg list \
  --resource-group "[resource group name]" \
  --query '[].name' \
  --output tsv
```

You see this output:

```
my-vmNSG
```

Every VM on Azure is associated with at least one network security group. In this case, Azure created an NSG for you called *my-vmNSG*.

2. Run the following az network nsg rule list command to list the rules associated with the NSG named *my-vmNSG*:

```
az network nsg rule list \
  --resource-group "[resource group name]" \
  --nsg-name my-vmNSG
```

   You see a large block of text in JSON format in the output. In the next step, you'll run a similar command that makes this output easier to read.

3. Run the az network nsg rule list command a second time. This time, use the --query argument to retrieve only the name, priority, affected ports, and access (**Allow** or **Deny**) for each rule. The --output argument formats the output as a table so that it's easy to read.

```
az network nsg rule list \
  --resource-group "[resource group name]" \
  --nsg-name my-vmNSG \
  --query '[].{Name:name, Priority:priority, Port:destinationPortRange, Access:access}' \
  --output table
```

   You see this output:

```
Name               Priority    Port    Access
-----------------  ----------  ------  --------
default-allow-ssh  1000        22      Allow
```

   You see the default rule, *default-allow-ssh*. This rule allows inbound connections over port 22 (SSH). SSH (Secure Shell) is a protocol that's used on Linux to allow administrators to access the system remotely. The priority of this rule is 1000. Rules are processed in priority order, with lower numbers processed before higher numbers.

   By default, a Linux VM's NSG allows network access only on port 22. This port enables administrators to access the system. You need to also allow inbound connections on port 80, which allows access over HTTP.

Task 3: Create the network security rule

Here, you create a network security rule that allows inbound access on port 80 (HTTP).

1. Run the following az network nsg rule create command to create a rule called *allow-http* that allows inbound access on port 80:

   ```
   az network nsg rule create \
     --resource-group "[resource group name]" \
     --nsg-name my-vmNSG \
     --name allow-http \
     --protocol tcp \
     --priority 100 \
     --destination-port-range 80 \
     --access Allow
   ```

   For learning purposes, here you set the priority to 100. In this case, the priority doesn't matter. You would need to consider the priority if you had overlapping port ranges.

2. To verify the configuration, run az network nsg rule list to see the updated list of rules:

   ```
   az network nsg rule list \
     --resource-group "[resource group name]" \
     --nsg-name my-vmNSG \
     --query '[].{Name:name, Priority:priority, Port:destinationPortRange, Access:access}' \
     --output table
   ```

   You see both the *default-allow-ssh* rule and your new rule, *allow-http*:

   ```
   Name              Priority    Port    Access
   -----------------  ----------  ------  --------
   default-allow-ssh  1000        22      Allow
   allow-http         100         80      Allow
   ```

Task 4: Access your web server again

Now that you configured network access to port 80, let's try to access the web server a second time.

Note

After you update the NSG, it may take a few moments before the updated rules propagate. Retry the next step, with pauses between attempts, until you get the desired results.

1. Run the same curl command that you ran earlier:

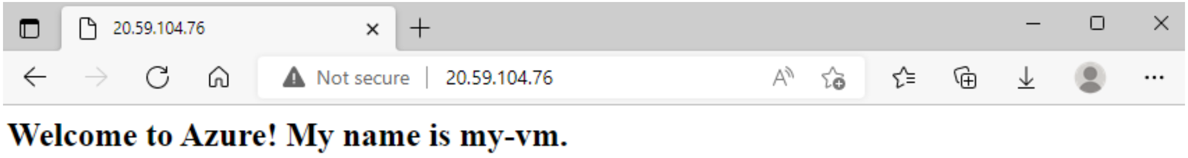
   ```
   curl --connect-timeout 5 http://$IPADDRESS
   ```

   You see this response:

   HTMLCopy

   ```
   <html><body><h2>Welcome to Azure! My name is my-vm.</h2></body></html>
   ```

2. As an optional step, refresh your browser tab that points to your web server. You see the home page:



Welcome to Azure! My name is my-vm.

Nice work. In practice, you can create a standalone network security group that includes the inbound and outbound network access rules you need. If you have multiple VMs that serve the same purpose, you can assign that NSG to each VM at the time you create it. This technique enables you to control network access to multiple VMs under a single, central set of rules.

Clean up

Resources that you leave running can cost you money. You can delete resources individually or delete the resource group to delete the entire set of resources.

Run the following command to delete the resource group:

```
az group delete --name [resource group name]
```