# Lab Answer Key: Module 5: Creating and configuring virtual networks

# Lab: Create and configure virtual networks

## Exercise 1: Creating a virtual network

### Task 1: Create a virtual network by using Azure Portal

1. From MIA-CL1, start Microsoft Edge, go to **http://portal.azure.com**, and then, if prompted, sign in by using the Microsoft account that is the Service Administrator of your Azure subscription.

2. In the hub menu on the left side of the portal page, click **+ Create a resource**.

3. On the **New** blade, click **Networking** and then click **Virtual network**.

4. On the **Create virtual network** blade, specify the following settings, and then click **Create**:

   o Name: **labVNet1**

   o Address space: **10.0.0.0/16**

   o Subscription: ensure that the name of the target Azure subscription appears in the drop-down list

   o Resource group: click **Create new**, in the **Name** text box, type **10979F0501-LabRG**, and click **OK**.

   o Location: select the name of the Azure region that is available in your subscription and which is closest to the lab location

   o Subnet name: **subnet0**

   o Subnet address range: **10.0.0.0/24**

   o DDoS protection: **Basic**

   o Service endpoints: **Disabled**

   o Firewall: **Disabled**

**Note**: Ignore any messages about overlapping address spaces that might appear when you type the value in the **Address space** text box.

### Task 2: Create the first Azure VM in an availability set by using Azure Portal

1. On MIA-CL1, in the Microsoft Edge window, in the hub menu on the left side of the Azure portal page, click **+ Create a resource**.

2. On the **New** blade, click **Compute** and then click **Windows Server 2016 Datacenter**.

3. On the **Basics** tab of the **Create a virtual machine** blade, specify the following settings, and then click **Next: Disks**:

   o Subscription: select the same Azure subscription into which you deployed the virtual network in the first task of this exercise

   o Resource group: **10979F0501-LabRG**

   o Virtual machine name: **10979F0501-vm**

   o Region: select the same the Azure region into which you deployed the virtual network in the first task of this exercise

   o Availability options: **Availability set**

- o Availability set: click **Create new**, in the **Create new** pane, in the **Name** text box, type **10979F0501-avSet**, leave the **Fault domains** and **Update domains** settings with their default values, and click **OK**.

- o Image: **Windows Server 2016 Datacenter**

- o Size: accept the default size

- o Username: **Student**

- o Password: **Pa55w.rd1234**

- o Confirm password: **Pa55w.rd1234**

- o Public inbound ports: **None**

- o Already have a Windows license?: **No**

4. On the **Disks** tab of the **Create a virtual machine** blade, specify the following settings, and then click **Next: Networking**:

- o OS disk type: **Standard HDD**

- o Use managed disks: **Yes**          ← 메뉴 없음 (2019.4.25 확인)

5. On the **Networking** tab of the **Create a virtual machine** blade, specify the following settings, and then click **Next: Management**:

- o Virtual network: **labVNet1**

- o Subnet: **subnet0**

- o Public IP address: **None**

- o NIC network security group: **Basic**

- o Public inbound ports: **Allow selected ports**

- o Select inbound ports: **RDP**

- o Accelerated networking: **Off**

- o Place this virtual machine behind an existing load balancing solution?: **No**

6. On the **Management** tab of the **Create a virtual machine** blade, specify the following settings, and then click **Next: Guest config**:          ← **Guest config   : Advanced** 로 이름 바뀜

- o Boot diagnostics: **Off**

- o OS guest diagnostics: **Off**

- o System assigned managed identity: **Off**

- o Enable auto-shutdown: **Off**

- o Enable backup: **Off**

7. On the **Guest config** tab of the **Create a virtual machine** blade, accept the default settings, and then click **Next: Tags**.

8. On the **Tags** tab of the **Create a virtual machine** blade, accept the default settings, and then click **Next: Review + create**.

9. On the **Review + create** tab of the **Create a virtual machine** blade, review the list of settings and click **Create**.

10. Review the **Your deployment is underway** blade.

11. Wait for the deployment to complete.

**Note**: The deployment might take about 5 minutes.

## Task 3: Create the second Azure VM in an availability set by using Azure Portal

1. On MIA-CL1, in the Microsoft Edge window, in the hub menu on the left side of the Azure portal page, click **+ Create a resource**.

2. On the **New** blade, click **Compute** and then click **Windows Server 2016 Datacenter**.

3. On the **Basics** tab of the **Create a virtual machine** blade, specify the following settings, and then click **Next: Disks**:

   o  Subscription: select the same Azure subscription into which you deployed the virtual network in the first task of this exercise

   o  Resource group: **10979F0501-LabRG**

   o  Virtual machine name: **10979F0502-vm**

   o  Region: select the same the Azure region into which you deployed the virtual network in the first task of this exercise

   o  Availability options: **Availability set**

   o  Availability set: **10979F0501-avSet**

   o  Image: **Windows Server 2016 Datacenter**

   o  Size: accept the default size

   o  Username: **Student**

   o  Password: **Pa55w.rd1234**

   o  Confirm password: **Pa55w.rd1234**

   o  Public inbound ports: **None**

   o  Already have a Windows license?: **No**

4. On the **Disks** tab of the **Create a virtual machine** blade, specify the following settings, and then click **Next: Networking**:

   o  OS disk type: **Standard HDD**

   o  Use managed disks: **Yes**　　　　　　　　**← 메뉴 없음 (2019.4.25 확인)**

5. On the **Networking** tab of the **Create a virtual machine** blade, specify the following settings, and then click **Next: Management**:

   o  Virtual network: **labVNet1**

   o  Subnet: **subnet0**

   o  Public IP address: **None**

   o  NIC network security group: **Basic**

   o  Public inbound ports: **Allow selected ports**

   o  Select inbound ports: **RDP**

   o  Accelerated networking: **Off**

   o  Place this virtual machine behind an existing load balancing solution?: **No**

6. On the **Management** tab of the **Create a virtual machine** blade, specify the following settings, and then click **Next: Guest config**:          **← Guest config : Advanced 로 이름 바뀜**

   o Boot diagnostics: **Off**

   o OS guest diagnostics: **Off**

   o System assigned managed identity: **Off**

   o Enable auto-shutdown: **Off**

   o Enable backup: **Off**

7. On the **Guest config** tab of the **Create a virtual machine** blade, accept the default settings, and then click **Next: Tags**.

8. On the **Tags** tab of the **Create a virtual machine** blade, accept the default settings, and then click **Next: Review + create**.

9. On the **Review + create** tab of the **Create a virtual machine** blade, review the list of settings and click **Create**.

10. Review the **Your deployment is underway** blade.

11. Wait for the deployment to complete.

**Note**: The deployment might take about 5 minutes.

**Result**: Once you completed this exercise, you have created an Azure virtual network and deployed two Azure VMs in the same availability set into it.

# Exercise 2: Configuring load balancing of Azure VMs

## Task 1: Create an Azure load balancer

1. On MIA-CL1, in the Azure portal, in the hub menu, click **Create resource**, click **Networking**, and then click **Load Balancer**.

2. On the **Create load balancer** blade, specify the following settings:

   o Name: **10979F0501-ilb**

   o Type: **Public**

   o SKU: **Basic**

   o Public IP address: ensure that the **Create new** option is selected and, in the **Name** text box, type **10979F0501-ilb-pip**

   o Assignment: **Dynamic**

   o Subscription: select the same Azure subscription into which you deployed the virtual network in the first exercise of this lab

   o Resource group: **10979F0501-LabRG**

   o Location: select the same the Azure region in which you created the virtual network in the first exercise of this lab.

3. Click **Create**. Wait for the deployment to complete.

## Task 2: Configure the Azure load balancer

1. On MIA-CL1, in the Microsoft Edge window displaying the Azure portal, in the hub menu, click **Resource groups**.

2. On the **Resource groups** blade, click **10979F0501-LabRG**.

3. On the **10979F0501-LabRG** blade, in the list of resources, click the entry **10979F0501-ilb** representing the newly provisioned load balancer.

4. On the 10979F0501-ilb blade, click **Backend pools**, and then click **+ Add**.

5. On the Add backend pool blade, in the **Name** text box, type **10979F0501-ilb-bepool**, ensure that **IPv4** is selected, and then, in the **Associated to** drop down list, click **Availability set**

6. In the **Availability set** drop down list, click **10979F0501-avSet**.

7. Click **Add a target network IP configuration**, in the **Target virtual machine** drop down list, click **10979F0501-vm** and, in the **Network IP configuration** drop down list, click the **ipconfig1** entry.

8. Click **Add a target network IP configuration**, in the **Target virtual machine** drop down list, click **10979F0502-vm** and, in the **Network IP configuration** drop down list, click the **ipconfig1** entry.

9. Click **OK** and wait until the update operation completes.

10. On the 10979F0501-ilb blade, click **Health probes**, and then click **+ Add**.

11. On the **Add health probe** blade, specify the following settings:

    o Name: **10979F0501-ilb-probetcp3389**

    o Protocol: **TCP**

    o Port: **3389**

    o Interval: **5**

    o Unhealthy threshold: **2**

12. Click **OK** and wait until the operation completes.

13. On the 10979F0501-ilb blade, click **Load balancing rules**, and then click **+ Add**.

14. On the **Add load balancing rule** blade, specify the following settings:

    o Name: **10979F0501-ilb-ruletcp3389**

    o IP Version: **IPv4**

    o Frontend IP address: **LoadBalancerFrontEnd**

    o Protocol: **TCP**

    o Port: **3389**

    o Backend port: **3389**

    o Backend Pool: **10979F0501-ilb-bepool (2 virtual machines)**

    o Probe: **10979F0501-ilbprobetcp3389 (TCP:3389)**

    o Session persistence: **None**

    o Idle timeout (minutes): **4**

    o Floating IP (direct server return): **Disabled**

15. Click **OK**. Wait until the operation completes.

16. On MIA-CL1, in the Azure portal, on the 10979F0501-ilb blade, click **Overview**. In the **Essentials** section, identify the public IP address assigned to the load balancer.

**Note**: This configuration will allow you to connect to either of two Azure VMs via RDP even though neither of them has directly assigned public IP address. The Azure VMs in this configuration can act as highly available jump hosts for connections to other Azure VMs within the same Azure virtual network.

## Task 3: Test Azure load balancing

1. On MIA-CL1, right-click **Start**, click **Run**, in the **Open** text box, type the following and press Enter (replace the placeholder `<10979F0501-ilb-pip>` with the IP address you identified in the previous step):

2. `mstsc /f /admin /v:<10979F0501-ilb-pip>`

3. When prompted for credentials, type **Student** in the **User name** text box, **Pa55w.rd1234** in the **Password** text box, and click **OK**.

4. When prompted to confirm that you want to connect even though the identity of the remote computer cannot be verified, click **Yes**.

5. Within the Remote Desktop session, in the **Server Manager** window, click **Local Server** and identify the value of the **Computer name** entry.

6. Within the Remote Desktop session, click **Start**, click the **Power** icon, and then click **Shut down**.

7. In the **Choose a reason that best describess why you want to shut down this computer** drop down list, select **Other (Planned)** and click **Continue**. This will automatically terminate the Remote Desktop session.

8. On MIA-CL1, right-click **Start**, click **Run**, in the **Open** text box, type the following and press Enter (replace the placeholder `<10979F0501-ilb-pip>` with the IP address you identified in the previous step:

9. `mstsc /f /admin /v:<10979F0501-ilb-pip>`

10. When prompted to confirm that you want to connect even though the identity of the remote computer cannot be verified, note the name in the certificate from the remote computer and verify that this is the other Azure VM. Click **Yes**.

11. Within the Remote Desktop session, in the **Server Manager** window, click **Local Server** and identify the value of the **Computer name** entry. Note that you were automatically redirected to the other Azure VM.

12. Close all open windows.

## Task 4: Prepare for the next module

1. From MIA-CL1, start Microsoft Edge, browse to **http://portal.azure.com**, and, if prompted, sign in by using the Microsoft account that is the Service Administrator of your Azure subscription.

2. In the Azure Portal, in the Hub menu, click **Resource groups**.

3. On the **Resource groups** blade, click the ellipsis (**...**) on the right hand side of the **10979F0501-LabRG** entry.

4. Click **Delete**.

5. Close Microsoft Edge.

When you are finished with the lab, do not revert the virtual machines. Please keep all of the VMs running. The VMs in their current state are required for the next module.

**Result**: Once you completed this exercise, you have deployed an Azure load balancer and tested its functionality.

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