

Assignment 4

1. A. Create a Vnet, 2 Subnets

Resources :

<https://learn.microsoft.com/en-us/azure/virtual-network/virtual-networks-overview>

2. Subnet-1: Linux VM, WindowsVM
3. Subnet-2: SQL DB, B. Create 4 VNets
4. 1. Management Vnet (HUB)
5. 2. Production Vnet
6. 3. Testing Vnet
7. 4. Developing Vnet
8. And Configure Hub and Spoke Architecture and verify it's working by launching VM in each VNet and ping from Management VM to every other VM
9. Create a Internal and External Load Balancer

Resources :

<https://www.youtube.com/watch?v=T7XU6Lz8Jw><https://learn.microsoft.com/en-us/azure/virtual-network/virtual-networks-overview>

0. Create and test Azure Application gateway

Resources :

<https://www.youtube.com/watch?v=B3O6bXu-NbM><https://learn.microsoft.com/en-us/azure/virtual-network/virtual-networks-overview>

1. **Create Subnets and VMs:**
 - o Subnet 1: Linux VM and Windows VM
 - o Subnet 2: SQL DB (for simplicity, we'll use a VM for the SQL database)
2. **Create 4 VNets:**
 - o Management VNet (HUB)
 - o Production VNet
 - o Testing VNet
 - o Development VNet
3. **Configure Hub and Spoke Architecture:**
 - o Set up VNet peering
 - o Configure routing
 - o Verify connectivity
4. **Create Internal and External Load Balancers.**

Step 1: Create Subnets and VMs

Create Subnets

1. **Navigate to the Azure Portal:**
 - Open the [Azure portal](#).
2. **Create Virtual Network with Two Subnets:**
 - Follow the steps mentioned previously to create a VNet with two subnets.

Create VMs in Subnet 1

1. **Create a Linux VM:**
 - In the Azure portal, click "Create a resource".
 - Search for "Virtual Machine" and select it.
 - Click "Create".
 - Configure the Linux VM:
 - **Basics:** Fill in the required fields.
 - **Size:** Select a VM size.
 - **Settings:** Under "Networking", select the VNet and subnet1.
 - Click "Review + create" and then "Create".
2. **Create a Windows VM:**
 - Follow the same steps to create another VM but choose a Windows OS.
 - Ensure it is in the same subnet1.

Create SQL DB in Subnet 2

1. **Create a SQL Server VM:**
 - Follow the same steps to create a VM but select an image for SQL Server.
 - Ensure it is in subnet2.

Step 2: Create 4 VNets

1. **Create Management VNet (HUB):**
 - Navigate to "Create a resource".
 - Search for "Virtual Network" and create the Management VNet.
2. **Create Production VNet:**
 - Repeat the steps to create the Production VNet.
3. **Create Testing VNet:**
 - Repeat the steps to create the Testing VNet.
4. **Create Development VNet:**
 - Repeat the steps to create the Development VNet.

Step 3: Configure Hub and Spoke Architecture

Set Up VNet Peering

1. **Peer Spoke VNets to HUB VNet:**
 - Go to the Management VNet.
 - Select "Peerings" and click "Add".
 - Configure the peering settings:
 - Peer the Production VNet.

- Peer the Testing VNet.
- Peer the Development VNet.
- Repeat this process in each spoke VNet to peer back to the HUB.

Configure Routing (Optional for Custom Routing)

1. **Create Route Table:**
 - Navigate to "Create a resource".
 - Search for "Route Table" and create it.
 - Associate the route table with the subnets in the Management VNet.

Verify Connectivity

1. **Create VMs in Each VNet:**
 - Follow the steps to create VMs in each of the Production, Testing, and Development VNets.
2. **Ping from Management VM to Other VMs:**
 - SSH or RDP into the Management VM.
 - Ping the VMs in other VNets using their private IPs to verify connectivity.

Step 4: Create Internal and External Load Balancers

Internal Load Balancer

1. **Create an Internal Load Balancer:**
 - Navigate to "Create a resource".
 - Search for "Load Balancer" and select it.
 - Click "Create".
 - Configure the Load Balancer:
 - **Type:** Internal.
 - **Subnet:** Select the subnet (e.g., subnet1).
2. **Add Backend Pools and Health Probes:**
 - After the LB is created, configure the backend pool and health probe to include the VMs in the selected subnet.

External Load Balancer

1. **Create an External Load Balancer:**
 - Follow the same steps but choose "Public" for the type.
2. **Add Backend Pools and Health Probes:**
 - Configure the backend pool and health probe to include the VMs exposed to the public.

Summary

This guide outlines the steps to create a Virtual Network with subnets and VMs, establish a Hub and Spoke network architecture, and configure internal and external load balancers in Azure. This setup ensures efficient network segmentation, traffic management, and load distribution across your Azure infrastructure.

To create and test an Azure Application Gateway, follow these steps. The Application Gateway is a web traffic load balancer that enables you to manage traffic to your web applications.

Step 1: Create a Virtual Network with Subnets

1. Navigate to the Azure Portal:

- Open a web browser and go to the [Azure portal](#).

2. Create a Virtual Network:

- Select "Create a resource" from the left-hand menu.
- Search for "Virtual Network" and select it.
- Click "Create".

3. Configure the Virtual Network:

- **Basics:**
 - **Subscription:** Select your Azure subscription.
 - **Resource Group:** Select an existing resource group or create a new one.
 - **Name:** Enter a name for your virtual network.
 - **Region:** Choose the region where you want to create the VNet.
- **IP Addresses:**
 - **IPv4 Address Space:** Define the address space for the VNet (e.g., 10.0.0.0/16).

4. Add Subnets:

- In the same "IP Addresses" section, click "Add subnet".
 - **Name:** Enter a name for the first subnet (e.g., appGatewaySubnet).
 - **Subnet Address Range:** Define the address range for the first subnet (e.g., 10.0.1.0/24).
- Click "Add".
- Add a second subnet by clicking "Add subnet" again.
 - **Name:** Enter a name for the second subnet (e.g., backendSubnet).
 - **Subnet Address Range:** Define the address range for the second subnet (e.g., 10.0.2.0/24).
- Click "Add".

5. Review and Create:

- Review your configuration settings.
- Click "Review + create".
- After validation passes, click "Create".

Step 2: Create Virtual Machines in Backend Subnet

1. Create Backend VMs:

- In the Azure portal, click "Create a resource".
- Search for "Virtual Machine" and select it.
- Click "Create".
- Configure the VM:
 - **Basics:** Fill in the required fields.
 - **Size:** Select a VM size.
 - **Settings:** Under "Networking", select the VNet and backendSubnet.
- Click "Review + create" and then "Create".

2. Repeat for Additional VMs:

- Create additional VMs in the backendSubnet to form the backend pool.

Step 3: Create an Azure Application Gateway

1. **Navigate to Create a Resource:**
 - In the Azure portal, click "Create a resource".
 - Search for "Application Gateway" and select it.
 - Click "Create".
2. **Configure the Application Gateway:**
 - **Basics:**
 - **Subscription:** Select your Azure subscription.
 - **Resource Group:** Select an existing resource group or create a new one.
 - **Name:** Enter a name for your Application Gateway.
 - **Region:** Choose the region where your VNet is located.
 - **Settings:**
 - **Tier:** Choose "Standard V2" or "WAF V2" based on your needs.
 - **Enable Autoscaling:** Yes (set minimum and maximum instance count).
 - **Virtual Network:** Select the VNet you created.
 - **Subnet:** Select appGatewaySubnet.
 - **Frontend IP Configuration:**
 - **IP Address Type:** Choose "Public" or "Private" based on your needs.
 - If public, configure a new public IP address.
 - **Backend Pool:**
 - Add the backend VMs you created.
 - **Routing Rules:**
 - Configure the listener and routing rules to route traffic to the backend pool.
3. **Review and Create:**
 - Review your configuration settings.
 - Click "Review + create".
 - After validation passes, click "Create".

Step 4: Verify and Test the Application Gateway

1. **Check Deployment Status:**
 - In the Azure portal, go to "Resource groups".
 - Select your resource group and find the Application Gateway.
 - Verify that the Application Gateway deployment is successful.
2. **Test Access:**
 - Obtain the public IP address or DNS name of the Application Gateway.
 - Open a web browser and navigate to the IP address or DNS name.
 - You should see the web application hosted on the backend VMs.
3. **Monitoring and Diagnostics:**
 - In the Application Gateway resource, go to "Diagnostics settings" and enable diagnostics for logs and metrics.
 - Use Azure Monitor and Application Insights to monitor the performance and health of your Application Gateway.

Summary

By following these steps, you have successfully created an Azure Application Gateway, deployed backend VMs, and configured the gateway to route traffic to the backend pool. You can now test the functionality by accessing the Application Gateway's public IP address or DNS name.