Module 2 - Virtual Private Network (VPN)
Estimated Time: 40 minutes

Your organization plans to allow Windows 10 users to connect to the internal network by using the VPN client built into the operating system. Before you implement the VPN infrastructure, you need to evaluate VPN connectivity in a test environment. You will accomplish this by configuring Remote Access on a Windows Server 2016 computer and setting up a VPN connection from a Windows 10 computer.

Objectives
After completing this lab, students will be able to:

- Configure and test a VPN connection on a Windows 10 computer.

Lab environment
The lab consists of the following computers:

- LON-DC1 (172.16.0.10) – a Windows Server 2016 domain controller in the adatum.com single-domain forest.
- LON-SVR1 (172.16.0.11) – a Windows Server 2016 domain member server with Remote Server Administrative tools installed
- LON-CL1 – a Windows 10 Pro or Enterprise version 1607 (or newer) domain member computer with Remote Server Administration Tools for Windows 10 installed

All computers have Windows PowerShell Remoting enabled and have Internet connectivity

In this exercise, you will step through configuring Remote Access on a Windows Server 2016 computer. The main tasks for this exercise are as follows:
1. Install Remote Access server role on Windows Server 2016
3. Configure an Active Directory user to allow connectivity via VPN

▶ Task 1: Install Remote Access server role on Windows Server 2016
1. Sign in to the LON-SVR1 Windows Server 2016 lab virtual machine with the following credentials:
   - USERNAME: ADATUM\Administrator
   - PASSWORD: Pa55w.rd
2. From the Manage menu in Server Manager, select Add Roles and Features. This will launch Add Roles and Features Wizard.
3. On the Before you begin page, click Next
4. On the Select installation type page, ensure that Role-based or feature-based installation option is selected and click Next.
5. On the Select destination server page, ensure that the local server is selected and click Next.
6. On the **Server Roles** page, select **Remote Access** checkbox and click **Next**
7. On the **Select features** page, click **Next**.
8. On the **Remote Access** page, click **Next**.
9. On the **Select role services** page, enable the **DirectAccess and VPN (RAS)** checkbox and click **Next**.
10. When prompted, in the **Add Roles and Features Wizard** dialog box, click **Add Features**.
11. Click **Next**
12. On the **Confirm installation selections** page, click **Install** and wait for the installation to complete.

**Task 2: Configure Routing and Remote Access on Windows Server 2016**

1. While logged on to Windows Server 2016 computer, switch back to the **Server Manager** console and click the **Open the Getting Started Wizard** on the **Installation progress** page of the **Add Roles and Features Wizard**.

2. In the **Routing and Remote Access** console, right click the node representing the local server LON-SVR1 and select **Configure and Enable Routing and Remote Access**. This will launch Routing and Remote Access Server Setup Wizard.

3. On the **Welcome to the Routing and Remote Access Server Setup Wizard** page, click **Next**.

4. On the **Configuration** page, select **Custom configuration** and click **Next**.

5. On the **Custom Configuration** page, select the **VPN access** checkbox and click **Next**

6. On the **Completing the Routing and Remote Access Server Setup Wizard** page, click **Finish**.

7. When prompted, in the **Routing and Remote Access** dialog box, click **Start service**

8. In the **Routing and Remote Access** console, right click the node representing the local server LON-SVR1 and select **Properties** from the context sensitive menu.

9. In the **LON-SVR1 (local) Properties** dialog box, switch to the **Security** tab.

10. On the **Security** tab, click **Authentication Methods**

11. Take a note of the default authentication methods which are enabled:
   - Extensible authentication protocol (EAP)
   - Microsoft encrypted authentication version 2 (MS-CHAP v2)

12. Click **OK**
13. Switch to the IPv4 tab.
14. On the IPv4 tab, in the IPv4 address assignment section, select the Static address pool option.
15. Click Add.
16. In the New IPv4 Address Range, type in the following:
   - Start IP address: 192.168.0.1
   - End IP address: 192.168.0.255

This is the pool of IP addresses that will be assigned to the Remote Access server and VPN clients once the VPN connections are established.

17. Click OK twice.
18. In the Routing and Remote Access console, expand the IPv4 node and select the General node.
19. In the details pane, right-click the Ethernet interface and select Properties from the context sensitive menu.
20. In the Ethernet Properties dialog box, uncheck the Enable IP router manager checkbox.

This will allow us to verify VPN connectivity by pinging the Remote Access server from the VPN client via their VPN assigned IP addresses.

21. Click OK.

**Task 3: Enable Remote Access for an Active Directory user account**

1. While logged on to LON-SVR1 Windows Server 2016 computer, launch Active Directory Administrative Center from the Tools menu in Server Manager.
2. In the Active Directory Administrative Center window, expand Adatum (local) in the navigation pane.
3. Double-click the Users organizational unit.
4. Make sure that Administrator account is selected and click Properties in the Task pane.
5. In the Administrator dialog box, scroll down to the Extensions section. Click the Dial-in tab.
6. In the Network Access Permission, select Allow access and click OK.

Typically, you would not enable remote access permissions for the built-in Administrator account, but grant it to unprivileged accounts instead. Once again, we resort to this configuration for the sake of simplicity.

**Results:** After completing this exercise, you will have installed and configured Remote Access on a Windows Server 2016, as well as enabled Remote Access for an Active Directory user account.
Exercise 2: Configure and test a VPN connection on a Windows 10 computer

In this exercise, you create, configure, and test a VPN connection on a Windows 10 computer. The main tasks for this exercise are as follows:
1. Create and configure a VPN connection on a Windows 10 computer.
2. Test a VPN connection from a Windows 10 computer

▶ Task 1: Create and configure a VPN connection on a Windows 10 computer
1. Sign in to the LON-CL1 Windows 10 lab virtual machine using the following credentials:
   - USERNAME: ADATUM\Administrator
   - PASSWORD: Pa55w.rd
2. Click the Start button and select Settings
3. In the Settings app, click Network & Internet
4. On the NETWORK & INTERNET page, click VPN.
5. In the VPN section, click + Add a VPN connection.
6. On the Add a VPN connection page, specify the following:
   - VPN provider: Windows (built-in)
   - Connection name: LON-SVR1
   - Server name or address: 172.16.0.11
   - VPN type: Automatic
   - Type of sign-in info: User name and password
   - User name (optional): leave blank
   - Password (optional): leave blank
   - Remember my sign-in info: leave the default setting in place
7. Click Save.
8. Back in the VPN section, click Advanced options. Examine options available in on Connection properties page.
9. In the Search the web and Windows area in the taskbar, type ncpa.cpl. This will open Network Connections window. Note that the window contains an extra entry labeled LON-SVR1 of WAN Miniport (PPTP) type.
10. Right-click LON-SVR1 and select Properties from the context-sensitive menu.
11. In the LON-SVR1 Properties dialog box, switch to the Security tab and configure the following:
   - Type of VPN: Automatic
   - Data encryption: Optional encryption (connect even if no encryption)
   - Authentication: Microsoft CHAP Version 2 (MS-CHAP v2) and Automatically use my Windows logon name and password (and domain, if any)
12. Click OK.
You need to ensure that the authentication settings match on the Remote Access server and VPN clients.

**Task 2: Test a VPN connection from a Windows 10 computer**

1. While logged on to the Windows 10 lab virtual machine, launch **Command Prompt**
2. From the **Command Prompt**, type `ipconfig` and press the **Enter** key. Note that the Windows 10 lab virtual machine has a single network adapter (**Ethernet**) and a single IP address assigned to it.
3. Switch back to the **VPN** section of the **NETWORK & INTERNET** page of the **Settings** app.
4. Click **Connect**.
5. The connection should be successfully established, resulting with the LON-SVR1 connection listed with the **Connected** status.
6. Switch back to the **Command Prompt** and type `ipconfig`. Note that the Windows 10 computer has an additional IP address from the pool you defined in the previous exercise (192.168.0.2) assigned to the PPP adapter LON-SVR1.
7. Switch to the Windows Server 2016 lab virtual machine and launch **Command Prompt**
8. From the **Command Prompt**, type `ipconfig` and press the **Enter** key. Note that the Windows 2016 lab virtual machine has an additional IP address from the pool you defined in the previous exercise (192.168.0.1) assigned to the PPP adapter LON-SVR1.
9. Switch to the **Routing and Remote Access** console and click the **Remote Access Clients** node. Note that you can see there the connection from the Windows 10 lab virtual machine.
10. Switch back to the Windows 10 lab virtual machine.
11. From the **Command Prompt** type `ping 192.168.0.1` and press the **Enter** key. Note that the ping is successful and you get replies from this IP address.

**Results:** After completing this exercise, you will have created and configured a VPN connection on a Windows 10 computer, as well as tested the VPN connection.