R&D Document: Setting Up Site-to-Site VPN Using Hyper-V

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1. Introduction

This document provides a comprehensive guide to setting up a site-to-site VPN using Hyper-V. Site-to-site VPNs connect two networks over the internet securely, allowing resources to be shared as if they were on the same local network. Hyper-V, a virtualization platform by Microsoft, can host virtual machines that will act as VPN endpoints.

2. Prerequisites

Before starting, ensure the following prerequisites are met:

- Two physical servers with Hyper-V installed (one at each site).

- Windows Server (2012 R2 or later) installed on two virtual machines (VMs) hosted on Hyper-V.

- Administrative access to both Hyper-V hosts and Windows Server VMs.

- Properly configured IP addresses for each network and VMs.

- Basic understanding of networking concepts.

3. Hyper-V Network Setup

1. **Create Virtual Switches**:

   - Open Hyper-V Manager.

![Hyper-V Manager](https://www.windowsreport.com/wp-content/uploads/2023/02/Open-hyper-v-manager.jpg)

 - Select the Hyper-V host and click on `Virtual Switch Manager`.

![Virtual Switch Manager](https://www.getlabsdone.com/wp-content/uploads/2021/10/External-switch-creation.jpg)

 - Create two virtual switches: one for the internal network and one for the external network.

2. **Configure Network Adapters for VMs**:

 - Assign one network adapter of the VM to the internal virtual switch.

 - Assign the other network adapter to the external virtual switch.

![Configure Virtual Switch](https://www.windowsreport.com/wp-content/uploads/2023/02/Configure-Virtual-Switch.jpg)

4. Configuring Windows Server for Routing and Remote Access Service (RRAS)

1. **Install RRAS Role**:

 - Open `Server Manager` on the Windows Server VM.

 - Go to `Manage` > `Add Roles and Features`.

![Install Remote Access](https://learn.microsoft.com/en-us/windows-server/remote/remote-access/install-ra-08.png)

 - Select `Role-based or feature-based installation`.

 - Choose the server and install the `Remote Access` role.

 - Select `Routing` and `DirectAccess and VPN (RAS)`.

 - Complete the installation.

2. **Configure RRAS**:

 - Open `Routing and Remote Access` from Server Manager.

 - Right-click on the server and select `Configure and Enable Routing and Remote Access`.

![Configure Routing and Remote Access](https://learn.microsoft.com/en-us/windows-server/remote/remote-access/Configuring-and-Enable-RRAS.png)

 - Choose `Custom configuration`.

 - Select `VPN access` and `LAN routing`.

   - Start the service.

5. Configuring Site-to-Site VPN

1. **Configure VPN on First Site**:

   - Open `Routing and Remote Access`.

   - Right-click on `Demand-dial Interfaces` and select `New Demand-dial Interface`.

   ![New Demand-Dial Interface](https://learn.microsoft.com/en-us/windows-server/remote/remote-access/New-Demand-Dial-Interface.png)

   - Follow the wizard to name the interface and set it as a VPN type.

   - Enter the IP address of the remote site's external network.

   - Configure the authentication method and credentials.

   - Configure static routes for the remote network.

2. **Configure VPN on Second Site**:

   - Repeat the steps for the second site, using the IP address of the first site's external network.

6. Testing the VPN Connection

1. **Initiate the VPN Connection**:

   - On the first site's RRAS, right-click the demand-dial interface and select `Connect`.

   - Verify the connection status.

2. **Check Network Connectivity**:

   - Ping from one site's internal network to the other site's internal network.

   - Ensure that resources are accessible across the VPN.

7. Troubleshooting

- **Check IP Address Configuration**: Ensure IP addresses and subnet masks are correctly configured.

- **Verify RRAS Configuration**: Double-check the VPN and routing settings.

- **Firewall Settings**: Ensure that firewalls on both sites allow VPN traffic.

- **Event Logs**: Check Windows Event Logs for errors related to RRAS and networking.

8. Conclusion

Setting up a site-to-site VPN using Hyper-V involves configuring virtual networks, installing and configuring RRAS, and establishing VPN connections. This setup ensures secure communication between two sites over the internet.