Introduction

This document describes how to configure an Layer 2 Tunneling Protocol (L2TP) Tunnel between a windows machine and a Cisco router.

Prerequisites

Requirements

Cisco recommends that you have knowledge that windows machine can ping the physical interface IP address on the router.

Components Used

This document is not restricted to specific software and hardware versions.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Configure

Network Diagram

This document uses this network setup:
Configurations

Aggregator Configuration:

An example of the configuration on the Aggregator is shown:

Windows Machine Configurations and Settings

Complete these steps:

Step 1. Open **Network and Sharing Center** and click **Set up a new connection or network** as shown in this image.

Step 2. Select **Connect to a Workplace** and click **Next**
Step 3. Select **Use my Internet Connection (VPN)**

Step 4. Enter the IP Address of the Aggregator (in this case 192.168.1.1), give a name to the connection (in this case giving the name as VPDN) and click **Next**.
Step 5. Enter the username and password, and click **Connect**

Step 6. Verify the username and password
Step 7. It might fail for the first time as shown in this image.

Step 8. Click **Set up the connection anyway** and open **Networks** tab.
Step 9. Right click the connection (here VPDN) and click **Properties**. Verify the IP address of the Aggregator (here 192.168.1.1)

Step 10. Navigate to **Options** and verify the settings, as shown in this image.
Step 11. Navigate to **Security** > as shown in this image.

Step 12. Select **No encryption allowed** option under Data encryption dropdown menu:
Step 13. Uncheck **Microsoft CHAP Version 2** and click **OK**.

Step 14. Open network (here VPDN) and click **Connect**.
Step 15. Enter Username and Password and click **Connect**

Verify

Step 1. Open **Networks** tab again, select the network (named VPDN in this example) and verify that the status is Connected.
Step 2. Open command prompt and run `ipconfig /all` command.

IPv4 address and Domain Name Server (DNS) are assigned by the Aggregator after completing PPP Internet Protocol Control Protocol (IPCP) phase.

Step 3. Run `debug ppp negotiation` command and the other show commands on Aggregator:

```
Aggregator#  
*Apr 12 06:17:38.148: PPP: Alloc Context [38726D0C]  
*Apr 12 06:17:38.148: ppp11 PPP: Phase is ESTABLISHING  
*Apr 12 06:17:38.148: ppp11 PPP: Using vpn set call direction  
*Apr 12 06:17:38.148: ppp11 PPP: Treating connection as a callin  
*Apr 12 06:17:38.148: ppp11 PPP: No remote authentication for call-in  
*Apr 12 06:17:38.148: ppp11 LCP: Enter passive mode, state[Stopped]  
*Apr 12 06:17:38.607: ppp11 LCP: I CONFREQ [Stopped] id 0 len 21  
*Apr 12 06:17:38.607: ppp11 LCP: MRU 1400 (0x01040578)  
*Apr 12 06:17:38.607: ppp11 LCP: MagicNumber 0x795C7CD1 (0x0506795C7CD1)  
*Apr 12 06:17:38.607: ppp11 LCP: PFC (0x0702)  
*Apr 12 06:17:38.607: ppp11 LCP: ACFC (0x0802)  
*Apr 12 06:17:38.607: ppp11 LCP: Callback 6 (0x0D0306)  
*Apr 12 06:17:38.607: ppp11 LCP: O CONFREQ [Stopped] id 1 len 10  
*Apr 12 06:17:38.607: ppp11 LCP: MagicNumber 0xF7C3D2B9 (0x0506F7C3D2B9)  
*Apr 12 06:17:38.607: ppp11 LCP: O CONFREJ [Stopped] id 0 len 7  
*Apr 12 06:17:38.608: ppp11 LCP: Callback 6 (0x0D0306)  
*Apr 12 06:17:38.608: ppp11 LCP: Event[Receive ConfReq-] State[Stopped to REQsent]  
*Apr 12 06:17:38.615: ppp11 LCP: I CONFACK [REQsent] id 1 len 10  
*Apr 12 06:17:38.615: ppp11 LCP: MagicNumber 0xF7C3D2B9 (0x0506F7C3D2B9)  
*Apr 12 06:17:38.615: ppp11 LCP: Event[Receive ConfAck] State[REQsent to ACKrcvd]  
*Apr 12 06:17:38.615: ppp11 LCP: I CONFREQ [ACKrcvd] id 1 len 18  
*Apr 12 06:17:38.615: ppp11 LCP: MRU 1400 (0x01040578)  
*Apr 12 06:17:38.615: ppp11 LCP: MagicNumber 0x795C7CD1 (0x0506795C7CD1)  
*Apr 12 06:17:38.616: ppp11 LCP: PFC (0x0702)  
*Apr 12 06:17:38.616: ppp11 LCP: ACFC (0x0802)  
*Apr 12 06:17:38.616: ppp11 LCP: O CONFNAK [ACKrcvd] id 1 len 8  
*Apr 12 06:17:38.616: ppp11 LCP: MRU 1500 (0x010405DC)  
*Apr 12 06:17:38.616: ppp11 LCP: Event[Receive ConfReq-] State[ACKrcvd to ACKrcvd]  
*Apr 12 06:17:38.617: ppp11 LCP: I CONFREQ [ACKrcvd] id 2 len 18  
*Apr 12 06:17:38.617: ppp11 LCP: MRU 1400 (0x01040578)  
*Apr 12 06:17:38.617: ppp11 LCP: MagicNumber 0x795C7CD1 (0x0506795C7CD1)  
*Apr 12 06:17:38.617: ppp11 LCP: PFC (0x0702)  
*Apr 12 06:17:38.617: ppp11 LCP: ACFC (0x0802)  
*Apr 12 06:17:38.617: ppp11 LCP: O CONFNAK [ACKrcvd] id 2 len 8  
*Apr 12 06:17:38.617: ppp11 LCP: MRU 1500 (0x010405DC)  
*Apr 12 06:17:38.617: ppp11 LCP: Event[Receive ConfReq-] State[ACKrcvd to ACKrcvd]  
*Apr 12 06:17:38.618: ppp11 LCP: I CONFREQ [ACKrcvd] id 3 len 18  
```
*Apr 12 06:17:38.618: ppp11 LCP: MRU 1500 (0x010405DC)
*Apr 12 06:17:38.618: ppp11 LCP: MagicNumber 0x795C7CD1 (0x0506795C7CD1)
*Apr 12 06:17:38.618: ppp11 LCP: PFC (0x0702)
*Apr 12 06:17:38.618: ppp11 LCP: ACFC (0x0802)
*Apr 12 06:17:38.618: ppp11 LCP: O CONFACK [ACKrcvd] id 3 len 18
*Apr 12 06:17:38.618: ppp11 LCP: MRU 1500 (0x010405DC)
*Apr 12 06:17:38.618: ppp11 LCP: MagicNumber 0x795C7CD1 (0x0506795C7CD1)
*Apr 12 06:17:38.618: ppp11 LCP: PFC (0x0702)
*Apr 12 06:17:38.619: ppp11 LCP: Event[Receive ConfReq+] State[Ackrcvd to Open]
*Apr 12 06:17:38.621: ppp11 LCP: I IDENTIFY [Open] id 4 len 18 magic 0x795C7CD1MSRASV5.20
*Apr 12 06:17:38.621: ppp11 LCP: I IDENTIFY [Open] id 5 len 24 magic 0x795C7CD1MSRAS-0-ADMIN-PC
*Apr 12 06:17:38.621: ppp11 LCP: I IDENTIFY [Open] id 6 len 24 magic 0x795C7CD1Z8Of(U3G.cIwR<#
*Apr 12 06:17:38.640: ppp11 PPP: Phase is FORWARDING, Attempting Forward
*Apr 12 06:17:38.657: Vi3.1 PPP: Phase is ESTABLISHING, Finish LCP
*Apr 12 06:17:38.657: Vi3.1 PPP: Phase is UP
*Apr 12 06:17:38.657: Vi3.1 IPCP: Protocol configured, start CP. state[Initial]
*Apr 12 06:17:38.657: Vi3.1 IPCP: Event[OPEN] State[Initial to Starting]
*Apr 12 06:17:38.657: Vi3.1 IPCP: O CONFREQ [Starting] id 1 len 10
*Apr 12 06:17:38.657: Vi3.1 IPCP: Address 172.16.1.1 (0x0306AC100101)
*Apr 12 06:17:38.657: Vi3.1 IPCP: Event[UP] State[Starting to REQsent]
*Apr 12 06:17:38.657: Vi3.1 IPCP: Process pending ncp packets
*Apr 12 06:17:38.657: Vi3.1 IPCP: Redirect packet to Vi3.1
*Apr 12 06:17:38.657: Vi3.1 IPCP: I CONFREQ [REQsent] id 8 len 34
*Apr 12 06:17:38.657: Vi3.1 IPCP: Address 0.0.0.0 (0x030600000000)
*Apr 12 06:17:38.657: Vi3.1 IPCP: PrimaryDNS 0.0.0.0 (0x810600000000)
*Apr 12 06:17:38.657: Vi3.1 IPCP: SecondaryDNS 0.0.0.0 (0x830600000000)
*Apr 12 06:17:38.657: Vi3.1 IPCP: SecondaryWINS 0.0.0.0 (0x840600000000)
*Apr 12 06:17:38.657: Vi3.1 IPCP AUTHOR: Done. Her address 0.0.0.0, we want 0.0.0.0
*Apr 12 06:17:38.657: Vi3.1 IPCP: Pool returned 10.1.1.9
*Apr 12 06:17:38.657: Vi3.1 IPCP: O CONFNAK [ACKrcvd] id 9 len 22
*Apr 12 06:17:38.657: Vi3.1 IPCP: Address 10.1.1.9 (0x03060A010109)
*Apr 12 06:17:38.657: Vi3.1 IPCP: PrimaryDNS 4.2.2.1 (0x810604020201)
*Apr 12 06:17:38.657: Vi3.1 IPCP: SecondaryDNS 4.2.2.2 (0x830604020202)
*Apr 12 06:17:38.657: Vi3.1 IPCP: Event[Receive ConfReq+] State[Ackrcvd to Open]
Aggregator#show caller ip
<table>
<thead>
<tr>
<th>Line</th>
<th>User</th>
<th>IP Address</th>
<th>Local Number</th>
<th>Remote Number</th>
<th>&lt;-&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vi3.1</td>
<td>-</td>
<td>10.1.1.9</td>
<td>-</td>
<td>-</td>
<td>in</td>
</tr>
</tbody>
</table>

Aggregator#show ip interface brief | exclude un

<table>
<thead>
<tr>
<th>Interface</th>
<th>IP-Address</th>
<th>OK? Method Status</th>
<th>Status</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>GigabitEthernet0/0/1</td>
<td>192.168.1.1</td>
<td>YES manual up</td>
<td>up</td>
<td></td>
</tr>
<tr>
<td>Loopback100</td>
<td>172.16.1.1</td>
<td>YES manual up</td>
<td>up</td>
<td></td>
</tr>
</tbody>
</table>

Step 4. Verify whether the Windows machine can reach the remote network behind Aggregator (in this case Loopback 100 interface)

```
Pinging 172.16.1.1 with 32 bytes of data:  
Reply from 172.16.1.1: bytes=32 time=1ms TTL=255  
Reply from 172.16.1.1: bytes=32 time=1ms TTL=255  
Reply from 172.16.1.1: bytes=32 time=1ms TTL=255  
Reply from 172.16.1.1: bytes=32 time=1ms TTL=255

Ping statistics for 172.16.1.1:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
  Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

Related Information

- Understanding VPDN
- Technical Support & Documentation - Cisco Systems