VPN Lab Exercise (host-to-gateway VPN)

1   Overview

This Labtainer exercise illustrates a simple host-to-gateway vpn implemented with openvpn, and a static shared key.

The example network, depicted in Figure 1 is identical to that in the "host-to-host VPN" (vpnlab) exercise, except there is now a gateway in front of the server. As with the previous exercise, the server offers a simple HTTP service, and the student will use wget on the client to retrieve html files from the server.

2   Lab Environment

This lab runs in the Labtainer framework, available at http://nps.edu/web/c3o/labtainers. That site includes links to a pre-built virtual machine that has Labtainers installed, however Labtainers can be run on any Linux host that supports Docker containers or on Docker Desktop on PCs and Macs.

From your labtainer-student directory start the lab using:

```
labtainer vpnlab2
```

A link to this lab manual will be displayed.

The openvpn application is pre-installed on the client and the gateway, and the corresponding openvpn configuration files already exist. To create an encrypted tunnel, the student only has to execute openvpn on the client and the gateway.
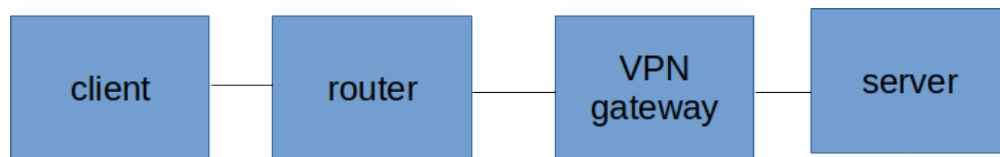

Figure 1: Network topology for vpnlab2

In this exercise, the student will observe that the client is unable to reach the server until the openvpn tunnel is established. And, use of the gateway allows the client to name the server using the server's network address rather than the network address associated with the tunnel as was required in the host-to-host VPN lab exercise.

3   Tasks

3.1   Attempt to retrieve data from the server

Use tcpdump on the router to display network traffic:

```
sudo tcpdump -n -XX -i eth0
```

Use wget on the client to fetch the index.html file

```
wget  http://<IPADDr>/index.html
```

Where <IPADDR> is the server network address, which you can learn by running "ifconfig" on the server. Observe that wget fails. Use <ctrl>c to exit wget.

3.2   Start the VPN

Start the openvpn program on the gateway:

```
sudo openvpn --config gateway.conf --daemon
```

Start the openvpn program on the client:

```
sudo  openvpn --config client.conf --daemon
```

Use wget again, just as was done previously. Note the wget succeeds this time. Note you are using the server's network address rather than the address associated with an encrypted tunnel. Observe the network traffic in tcpdump.

4   Submission

After finishing the lab, go to the terminal on your Linux system that was used to start the lab and type:

```
stoplab
```

When you stop the lab, the system will display a path to the zipped lab results on your Linux system. Provide that file to your instructor, e.g., via the Sakai site.