Set Up a VPN Server

Preparation: Reconfigure the LAN to avoid interference from your Assignment 1 operations

- Remove all the iptables rules you added to the OpenWrt Router so that they won't accidentally block access to the VPN server (which runs in the LAN).

  Test 1: run the following commands in the Router and screenshot the results:

  ```
  iptables -L FORWARD  --line-numbers
  ```

- **Test 2:** disable the port forwarding rules you set up in the Router for the WebGoat web server. Screenshot the results after you are done.

- Run the following command in both your WebGoat web server and the OpenVPN server (this will completely disconnect the WAN and the LAN):

  ```
  iptables -A INPUT -s 192.168.56.1 -j DROP
  ```

  [Note: please replace 192.168.56.1 with your host machine's LAN IP address]

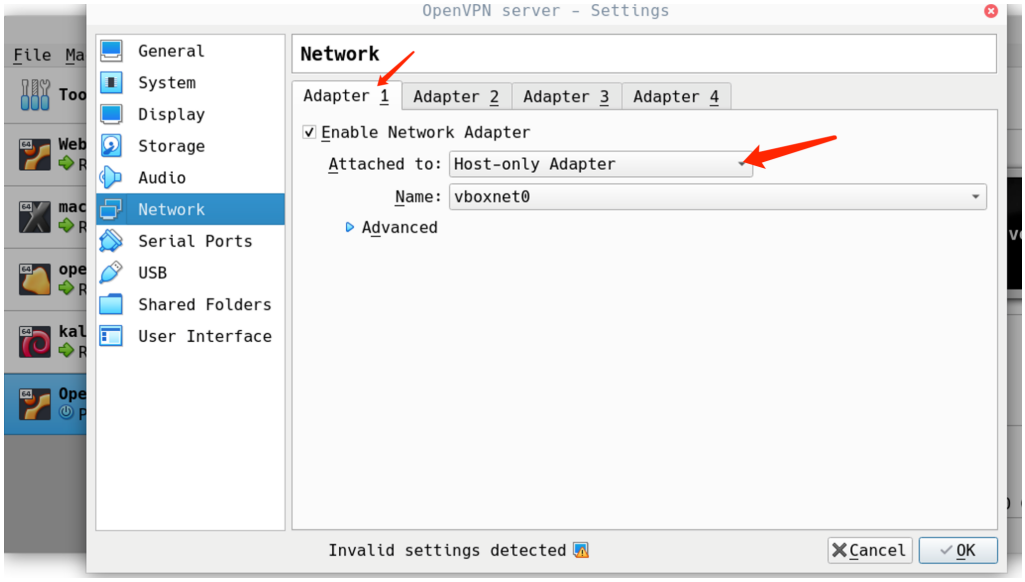
Test 3: Ping 192.168.56.101 from the Kali Linux and screenshot the result [Note: please replace 192.168.56.101 with the IP address of your WebGoat Webserver]

Test 4: Ping 192.168.56.104 from the Kali Linux and screenshot the result [Note: please replace 192.168.56.104 with the IP address of your OpenVPN server]

Step 1: Set up a new VM as the VPN Server

- Download the OpenVPN server OVA with Utah Google Account (uxxxxxxx@gcloud.utah.edu): https://drive.google.com/file/d/1bmf86EgCO4j0F5tMUbxSvMBKdmV1BUaX/view?usp=sharing

- Import, and make sure the network card configuration is the same as the picture below:



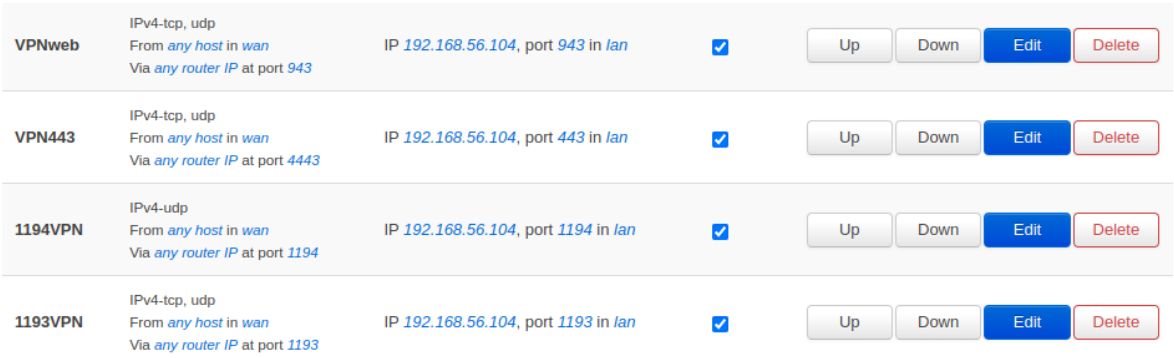
- Start the VM, with root credentials (user: root , password: openvpnas)
- **Test 5:** check the IPs in the OpenVPN server VM, which were 192.168.56.104 (LAN) in my local machine. It should belong to the 192.168.56.* subnetwork. Take a screenshot of the result.

- Log in console, and and the default route:

```
ip route add default via 192.168.56.10
service openvpnas restart
```

Step 2: Set up Port forwarding on Openwrt router

Please log into the web interface of your OpenWrt Router (the OpenWrt VM); You can log into the interface from your host's web browser. Please set up port forwarding rules as shown below (replace 192.168.56.104 with the actual IP address of your OpenVPN VM):



Test 6: Once you set up the port forwarding rules as above, take a screenshot

Step 3: Test SSH access

Step 1: Make sure your host is connected to the internet (so that the OpenVPN license can be verified)

Step 2: Run the following commands in the Kali Linux:

```
ssh webgoat@192.168.56.101
```

[Note: please replace 192.168.56.101 with the IP address of your WebGoat Webserver]

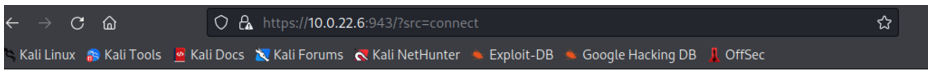
Test 7: Screenshot the results of the above command

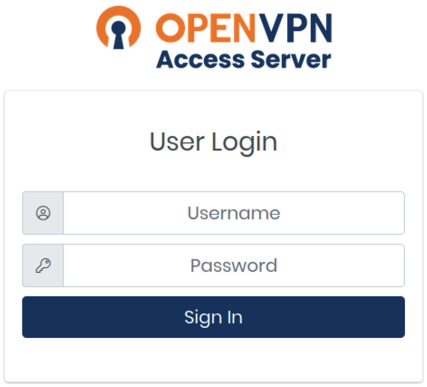
Open the web browser in Kali Linux and type the following URL: 192.168.56.101:8000/WebGoat

[Note: please replace 192.168.56.101 with the IP address of your WebGoat Webserver]

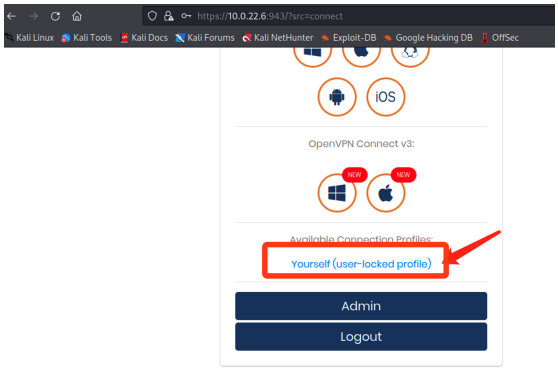
Test 8: Screenshot the results of the above operation

Step 3: Log into Kali Linux, and visit https://10.0.2.4:943 from a web browser. (User: openvpn, Password: openvpnas) [Note: replace 10.0.2.4 with the WAN IP address of your OpenWrt router]





Step 4: Download the VPN profile.

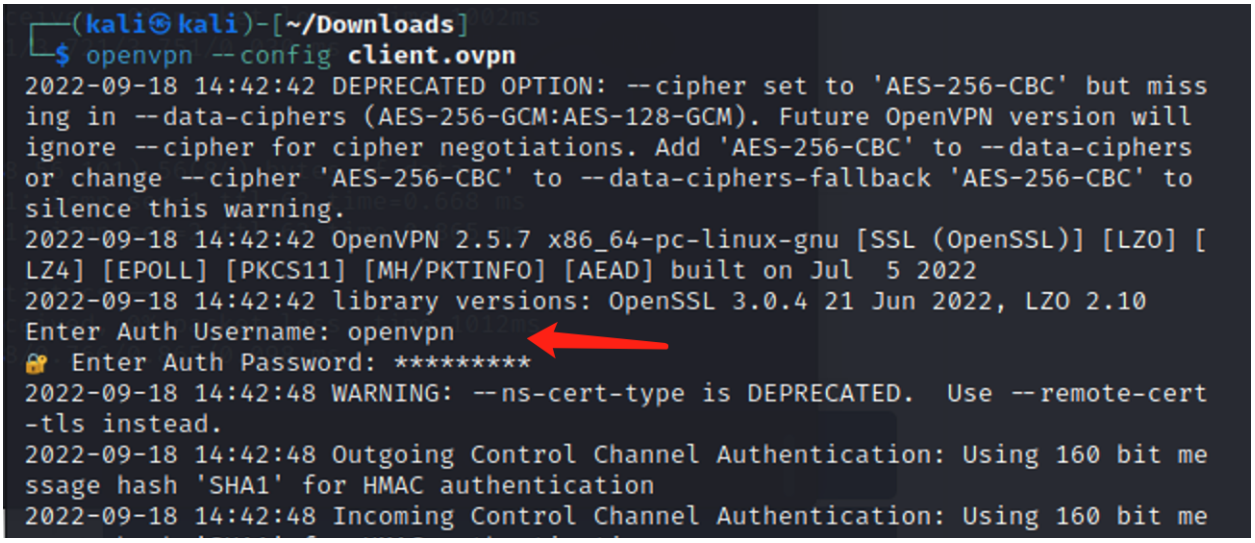


Step 5: Edit the downloaded file, and replace the 192.168.56.x with the OpenWrt Router's WAN IP address (something like10.0.2.*), and replace 443 with 4443 as following:

```
41 server-poll-timeout 4
42 nobind
43 remote 10.0.2.4 1194 udp
44 remote 10.0.2.4 1194 udp
45 remote 10.0.2.4 4443 tcp
46 remote 10.0.2.4 1194 udp
47 remote 10.0.2.4 1194 udp
48 remote 10.0.2.4 1194 udp
49 remote 10.0.2.4 1194 udp
50 remote 10.0.2.4 1194 udp
51 dev tun
52 dev-type tun
```

Step 6: Run the following command:

```
cd /path/where/you/keep/the/downloaded_file
sudo openvpn --config client.ovpn
```



(User: openvpn, Password: openvpnas)

After the VPN server is connected:

– Run the following commands in the Kali Linux:

ssh webgoat@192.168.56.101

[Note: please replace 192.168.56.101 with the IP address of your WebGoat Webserver]
[Note: open another terminal to do this instead of reusing the terminal where you start the openvpn client]

Test 9: Screenshot the results of the above command

– Open the web browser in Kali Linux and type the following URL: 192.168.56.101:8000/WebGoat

[Note: please replace 192.168.56.101 with the IP address of your WebGoat Webserver]

Test 10: Screenshot the results of the above operation

Submission:

Please create a PDF document to include the results of **Test 1** - **Test 10**, and submit the PDF document to https://www.gradescope.com/courses/411636/assignments/2279899/submissions