

<b>COMPUTING SUBJECT:</b>	<b>VPN and other problems</b>
<b>TYPE:</b>	Assignment
<b>IDENTIFICATION:</b>	VPNProblems
<b>COPYRIGHT:</b>	<i>Michael Claudius</i>
<b>LEVEL:</b>	Difficult to do, easy to understand
<b>TIME CONSUMPTION:</b>	2-10 hours
<b>EXTENT:</b>	50 lines
<b>OBJECTIVE:</b>	Solving various issues
<b>PRECONDITIONS:</b>	OpenVPN project VPN Useful links
<b>COMMANDS:</b>	

## **IDENTIFICATION:** VPNProblems/MC

### The Mission

There can be quite a lot of issues, when setting up OpenVPN. Help are given in this paper concerning:

Issue 0: VT-Box refused.

Issue 1: Ubuntu in the Virtual Box is microscopic, really too small.

Issue 2: Bridged or Nat in Virtual box ?

Issue 3: Cannot find the correct IP address of the OpenVPN server.

Issue 4. Where to use the server's IP-address in client1.opvn

Issue 5: Can only see IP6-addresses not IP4-addresses.

Issue 6: What is the VirtualBox IP address?

Issue 7: Transfer files from server to local computer (local client)

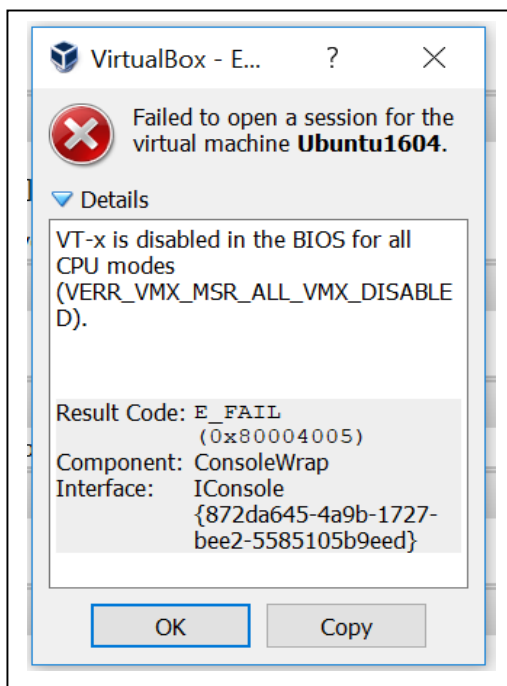
Issue 8: Various issues

- a. Renaming of adapter to MyTap.
- b. user nobody group nobody.
- c. Cannot find OpenSSH.
- d. No network connection from Ubuntu.

Issue 9: The non-issue i.e. the reward

Issue 0: Failed to open Ubuntu i.e. VT-x disabled or not available

*Ubuntu starts and you get the error VT-x disabled:*

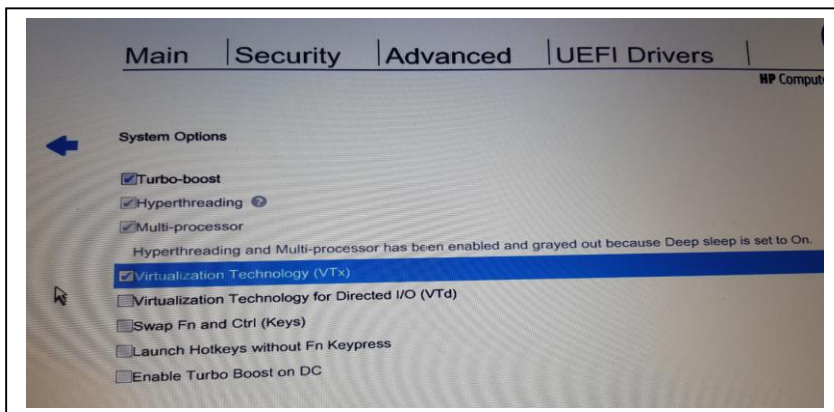


This indicates that the BIOS does not allow virtual machine. BIOS must be re-configured. VT-x enabled. Restart your computer and during start-up tap key ESC or maybe F2 many times to stop the start-up.

A menu is shown.

If its graphical:

- Choose: Advanced
- Choose: System Options
- Tick Virtualization boxes
- Click *Save* and *Exit*.

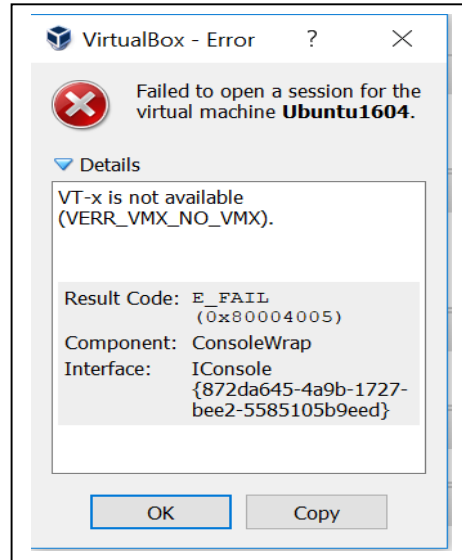


If its text based:

- Find (F10) the right menu point and tick the virtual settings VT-x.
- Then Choose *save* and *exit*.

Restart computer. Virtual Box and run Ubuntu. If it does not help read on!

*Ubuntu starts and you get the error VT-x not available:*



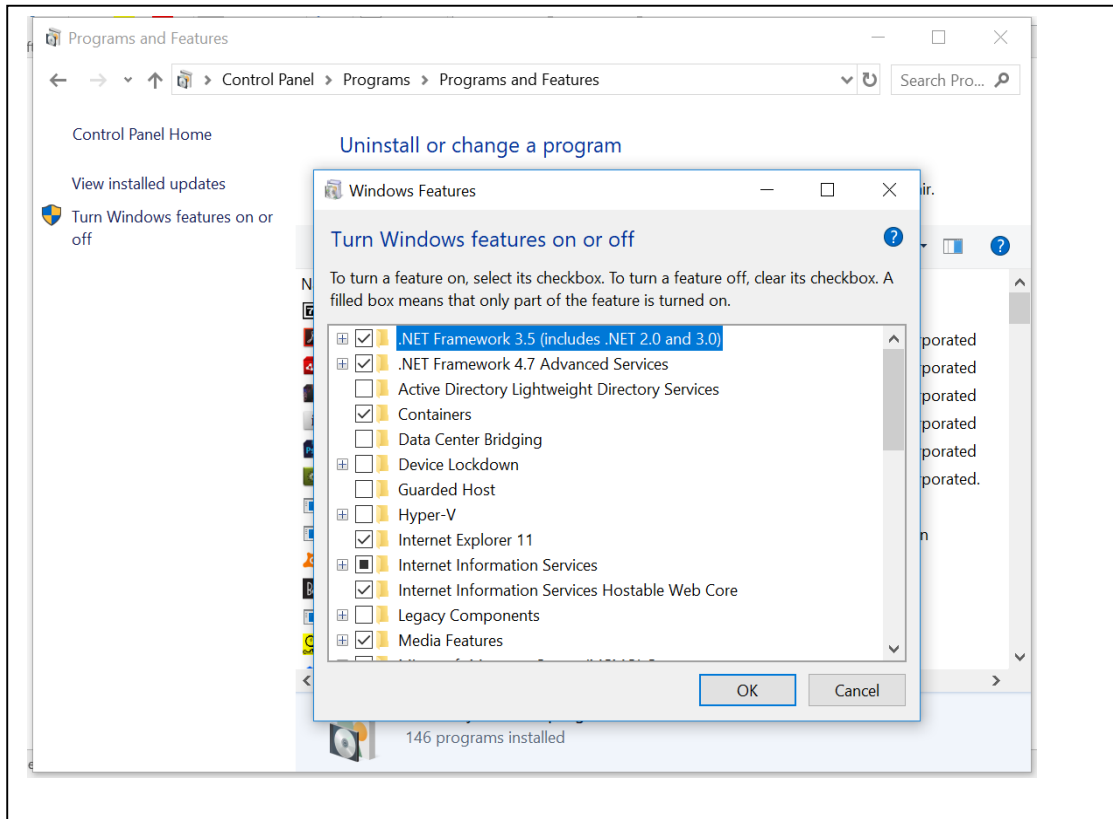
This is due to another program is using/occupying the virtual box.  
Start Control Panel and Choose:

Control Panel ->Network and Internet-> Network Connections

Disable the Hyper-V adapter(s), if any.  
If this does not help read on.

Disable the Hyper V in Windows features.  
Start Control Panel and Choose:

Control Panel -> Program -> Program and Features > Turn Windows features on/of



If this does not help then start *Task Manager* and see if there are other suspicious processes, which could occupy the VT-x; i.e. Windows-VPN, OpenVPN etc....

### Issue 1: Ubuntu window in VirtualBox is microscopic

#### *First in VirtualBox*

Choose: File -> Preferences -> Display  
Set: Maximum Guest Screen Size to None  
Set: Scale Factor to 200 (or 250)

Then choose your Ubuntu version

#### *For Ubuntu 16.04*

Choose: Settings -> Display ->  
Set: Scale to 200 or 250  
Set: Graphics Controller til VMSVGA

#### *For Ubuntu 18.04*

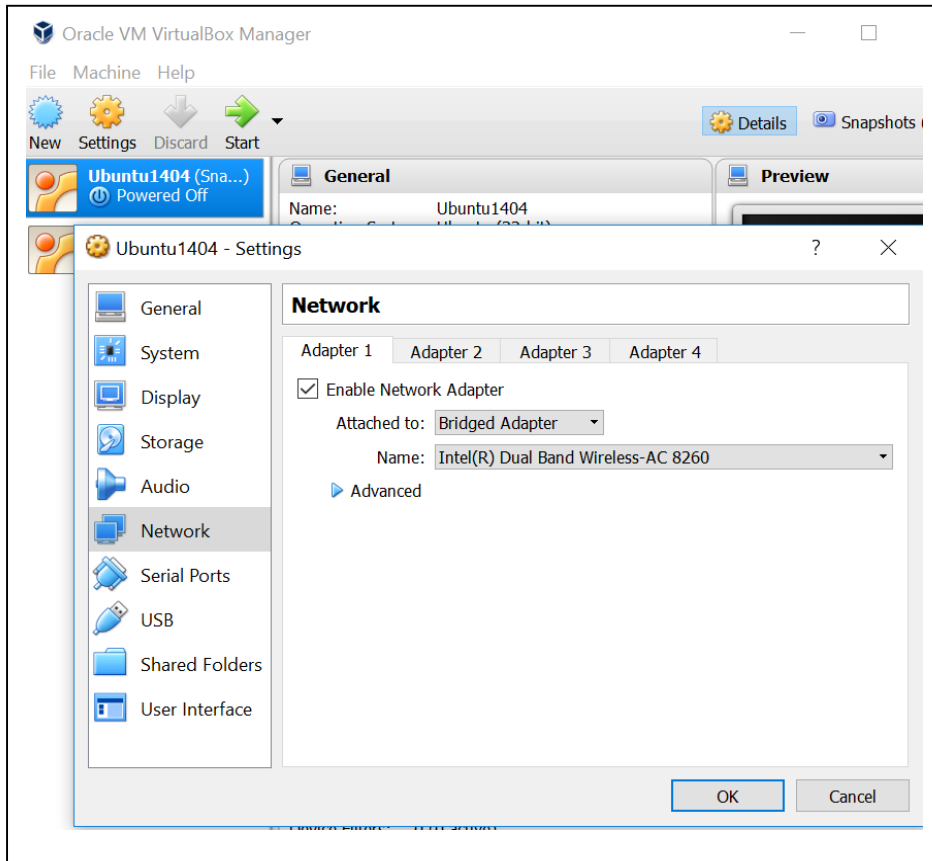
Choose: Settings -> Display ->  
Set: Scale to 200 or 250  
Set Graphics Controller til VBoxVGA

Now it is good and also possible to change the window size by mouse dragging.

### Issue 2: Bridged or Net in Virtual box ?

During installation you can just use NAT adapter setting. But when running VPN –only possible on our local LAN- one must use the Bridged Adapter in VirtualBox.

In VirtualBox Manager Choose Settings -> Network



Tick Enable Network Adapter and choose Bridged Adapter.

### Issue 3: Cannot find the correct public IP address of the OpenVPN server

Remember VPN is a virtual network where both server and client is on the "same LAN" using the tunnels mode.

When you made openvpn rules allowing traffic from client to server you have given the identification of the vpn-server as eth0 or something similar in the file /etc/ufw/before.rules

```
# START OPENVPN RULES
# NAT table rules
*nat
:POSTROUTING ACCEPT [0:0]
# Allow traffic from OpenVPN client to eth0
-A POSTROUTING -s 10.8.0.0/8 -o eth0 -j MASQUERADE
COMMIT
# END OPENVPN RULES
```

Therefore the IP address is NOT the address of the VirtualBox adapter.

Start Ubuntu and open the Terminal Window.

Give the command:

```
ifconfig
```

You will get 3-4 addresses, look for the name of your server, mine was **eth0**.

```
michael@michael-VirtualBox:~$
michael@michael-VirtualBox:~$ ifconfig
eth0      Link encap:Ethernet  HWaddr 08:00:27:40:f0:b6
          inet addr:192.168.3.155  Bcast:192.168.3.255  Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:fe40:f0b6/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:226 errors:0 dropped:0 overruns:0 frame:0
          TX packets:128 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:16418 (16.4 KB)  TX bytes:25871 (25.8 KB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:58 errors:0 dropped:0 overruns:0 frame:0
          TX packets:58 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:4574 (4.5 KB)  TX bytes:4574 (4.5 KB)

tun0     Link encap:UNSPEC  HWaddr 00-00-00-00-00-00-00-00-00-00-00-00-00-00-00-00
-00
          inet addr:10.8.0.1  P-t-P:10.8.0.2  Mask:255.255.255.255
          UP POINTOPOINT RUNNING NOARP MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:100
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

As seen eth0 has the IP address 192.168.3.155.

IF you only see IP6 addresses one will have to disable IP6 and enable IP4 addresses.



How to enable IP4-addresses. See issue 5.  
Where to use the IP-address. See issue 4.

Issue 4. Where to use the server's IP-address in client1.opvn  
Remember to use the IP-address in the client1.opvn. Find the line:

```
remote server_IP_address 1194
```

and replace the server\_IP\_address with the IP-address found using *ifconfig*.  
F.eks. to:

```
Remote 192.68.3.155
```

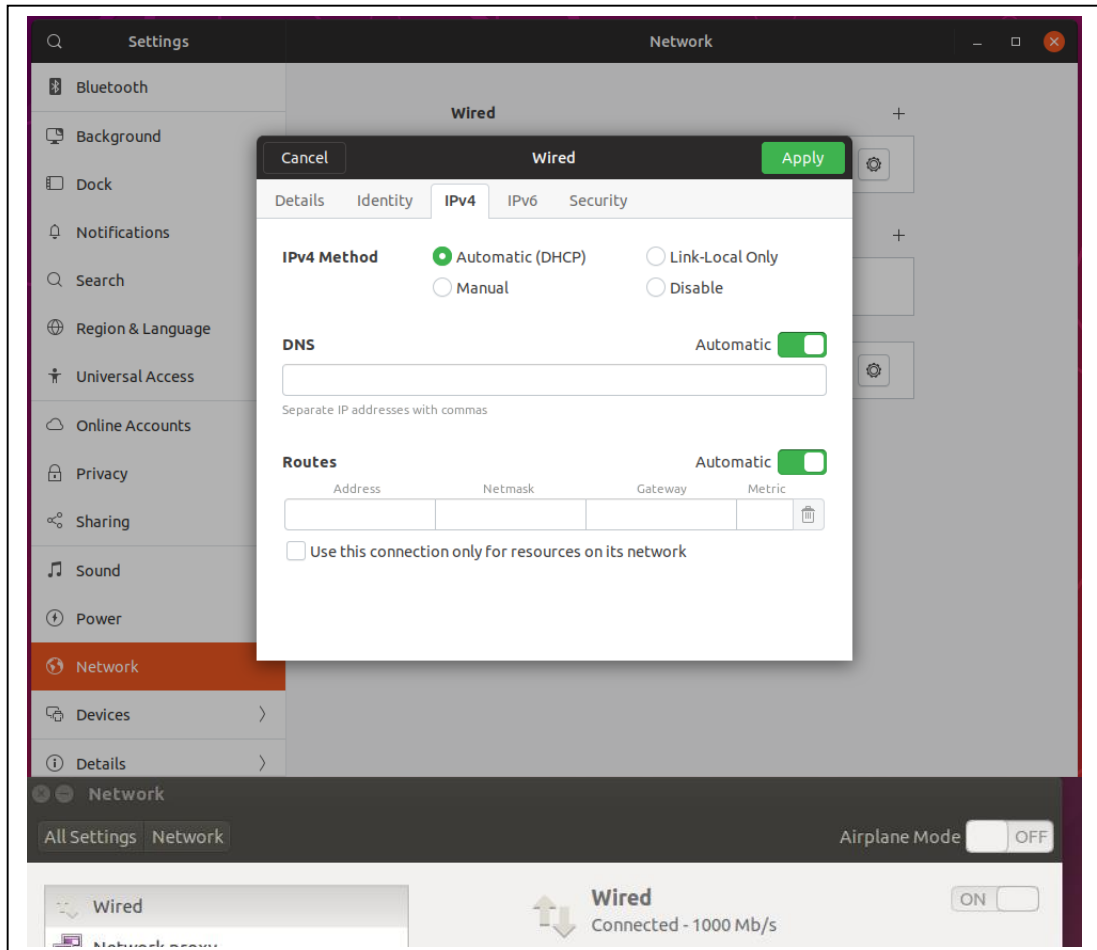
Issue 5: Can only see IP6-addresses not IP4-addresses

One will have to disable IP6 and enable IP4 addresses.

In Ubuntu Desktop

Choose -> System Settings

Choose: Network -> Click *Tool icon* by the *Wired bar*



Click: IPv4 Settings and change the Method to *Automatic(DHCP)* and *MAYBE/MAYBE NOT* tick the box (green) for *Use this connection.....*

Cancel Wired Apply

Details Identity **IPv4** IPv6 Security

**IPv4 Method**  Automatic (DHCP)  Link-Local Only  
 Manual  Disable

**DNS** Automatic

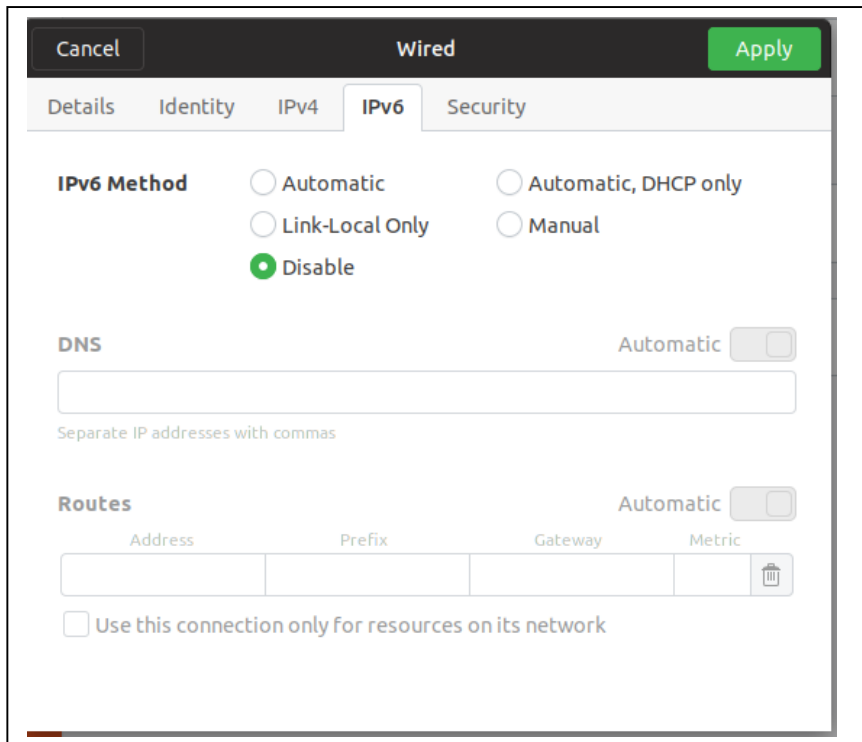
Separate IP addresses with commas

**Routes** Automatic

Address	Netmask	Gateway	Metric	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="button" value="🗑"/>

Use this connection only for resources on its network

Click: IPv6 Settings and change the method to *Disable/Ignore*:



Click: Apply

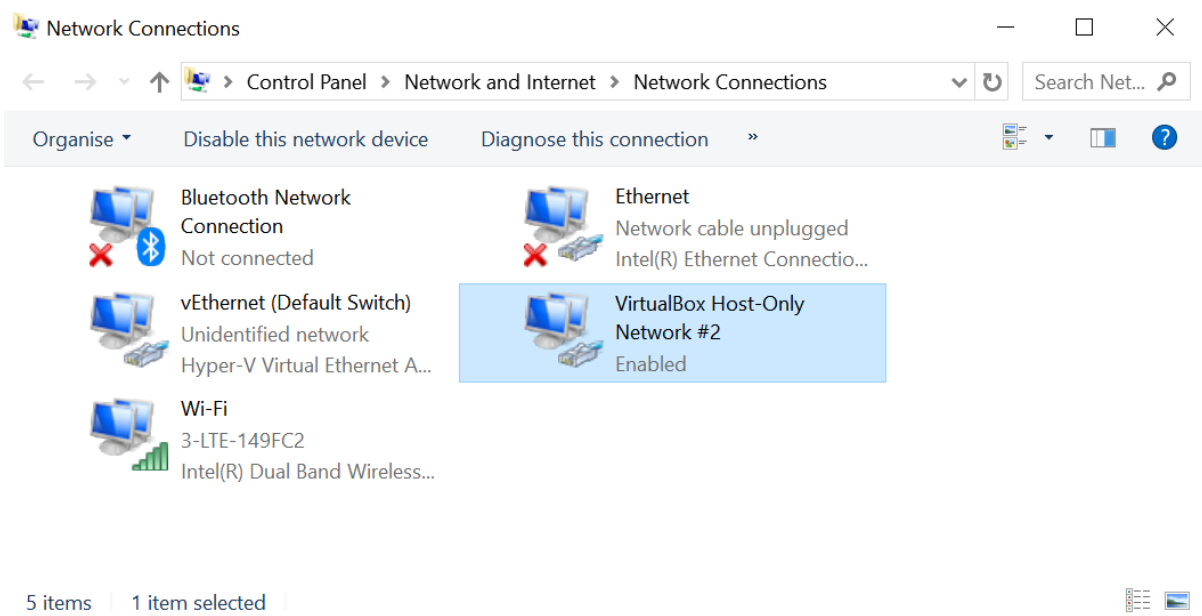
It can take a little time before settings have changed but try command *ifconfig* again.

If you cannot see the IPv4 address, then restart Ubuntu.

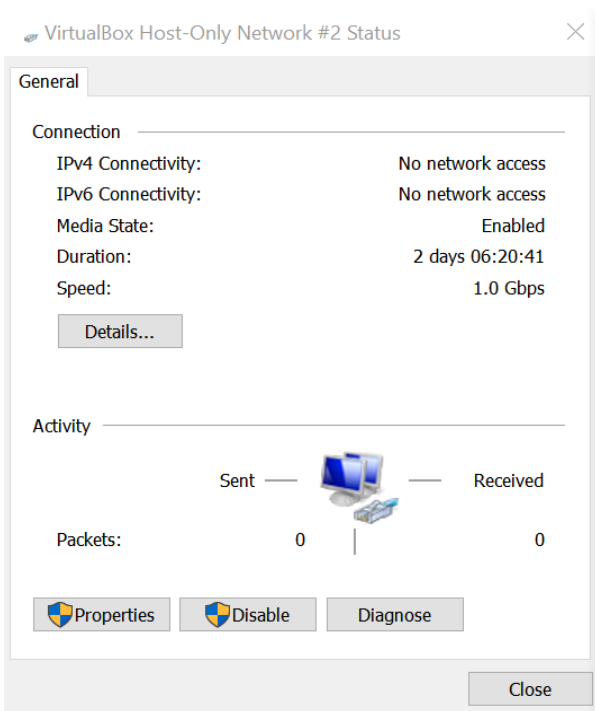
Alternatively change View to full screen mode and in the upper right corner select the Wifi symbol and click Disable Networking and again click on Enable Networking.

### Issue 6: What is the VirtualBox IP address?

Click Start -> Control Panel -> Network and Internet ->  
-> Network connections -> Change Adapter Settings



Click on VirtualBox adapter



Click on *Details* and you can see IPv4 address.

Network Connection Details ×

Network Connection Details:

Property	Value
Connection-specific DNS ...	
Description	VirtualBox Host-Only Ethernet Adapter #2
Physical Address	0A-00-27-00-00-16
DHCP Enabled	No
IPv4 Address	192.168.56.1
IPv4 Subnet Mask	255.255.255.0
IPv4 Default Gateway	
IPv4 DNS Server	
IPv4 WINS Server	
NetBIOS over Tcpip Enab...	Yes
Link-local IPv6 Address	fe80::e5a9:cff5:c598:ad8a%22
IPv6 Default Gateway	
IPv6 DNS Servers	fec0:0:0:ffff::1%1 fec0:0:0:ffff::2%1 fec0:0:0:ffff::3%1

Close

### Issue 7: Transfer files from server to local computer (local client)

There are several tools and tutorials for securely transferring files from the server to your local computer. I personally prefer A, then B and then C in that order ☺.

Method A: Open browser from Ubuntu, open your email and send an email with the certificates. Simple easy and fast.

Method B: Transfer the files using Winscp  
Download and install the program <https://winscp.net/eng/docs/installation>

Method C: Define a shared folder. Google it.

Method D: Drag and drop the file into windows desktop. Works very very seldom.

Method E: Copy client files and server certificate from Linux to a USB stick.  
I have tried it in 14.04 version of Ubuntu.

First find the USB icon lower right corner or somewhere else. Click on it and the it should appear in the virtual box left side.  
Then do something like:

```
ms@ms-VirtualBox:/etc/openssl/easy-rsa$ cd /media/ms/
ms@ms-VirtualBox:/media/ms$ ls
EEFE3165FE3126ED VBOXADDITIONS_5.0.16_105871
ms@ms-VirtualBox:/media/ms$ cd EEFE3165FE3126ED/
ms@ms-VirtualBox:/media/ms/EEFE3165FE3126ED$ ls
System Volume Information      VirtualBox-5.0.16-105871-Win.exe
ubuntu-14.04.4-desktop-amd64.iso
ms@ms-VirtualBox:/media/ms/EEFE3165FE3126ED$ sudo cp /etc/openssl/easy-rsa/keys/client.*
.
ms@ms-VirtualBox:/media/ms/EEFE3165FE3126ED$ sudo cp /etc/openssl/ca.crt .
ms@ms-VirtualBox:/media/ms/EEFE3165FE3126ED$ sudo cp /etc/openssl/easy-rsa/keys/client.ov
pn .
ms@ms-VirtualBox:/media/ms/EEFE3165FE3126ED$ cd /
ms@ms-VirtualBox:/$
```

Now follow the instructions how to create a openssl file on client as stated in the guide from DigitalOcean.

### Issue 8: Various issues

#### *Renaming MyTap. Dev-node*

If more than on access point. On server outcomment:

```
;  
; tap Mytap  
To:  
tap MyTap
```

In Control panel also rename the adapter to *MyTap*.

Also remember to rename the adapter on the windows client to MyTap.

In client configuration file, *client1.opvn*, out-comment dev-node:

```
dev-node MyTap
```

```
user nobody group nobody
```

In client1.opvn fil on the client side outcomment:

```
user nobody  
group nobody
```

#### *Cannot find OpenSSH*

Cannot find OpenSSH when you try to allow OpenSSH

Install ssh using the command:

```
sudo apt-get install ssh
```

#### *No network connection from VPN/Ubuntu*

Typical this is because you are on the wrong net.

Always use the local LAN, DMU MGV or your mobile hot spot !



## 9. The non-issue i.e. the reward

When connected you will see something like this:

```
Tue Nov 13 18:38:37 2018 MANAGEMENT: >STATE:1542130717,  
CONNECTED,SUCCESS,10.8.0.6,192.168.1.13,1194,,
```

*And it's time to relax and do the report.*

```
Tue Nov 13 18:38:31 2018 OpenVPN 2.4.6 x86_64-w64-mingw32 [SSL (OpenSSL)] [LZO] [LZ4] [PKCS11] [AEAD] built on Apr 26 2018  
Tue Nov 13 18:38:31 2018 Windows version 6.2 (Windows 8 or greater) 64bit  
Tue Nov 13 18:38:31 2018 library versions: OpenSSL 1.1.0h 27 Mar 2018, LZO 2.10  
Tue Nov 13 18:38:31 2018 MANAGEMENT: TCP Socket listening on [AF_INET]127.0.0.1:25340  
Tue Nov 13 18:38:31 2018 Need hold release from management interface, waiting...  
Tue Nov 13 18:38:31 2018 MANAGEMENT: Client connected from [AF_INET]127.0.0.1:25340  
Tue Nov 13 18:38:31 2018 MANAGEMENT: CMD 'state on'  
Tue Nov 13 18:38:31 2018 MANAGEMENT: CMD 'log all on'  
Tue Nov 13 18:38:31 2018 MANAGEMENT: CMD 'echo all on'  
Tue Nov 13 18:38:31 2018 MANAGEMENT: CMD 'bytecount 5'  
Tue Nov 13 18:38:31 2018 MANAGEMENT: CMD 'hold off'  
Tue Nov 13 18:38:31 2018 MANAGEMENT: CMD 'hold release'  
Tue Nov 13 18:38:31 2018 Outgoing Control Channel Authentication: Using 256 bit message hash 'SHA256' for HMAC authentication  
Tue Nov 13 18:38:31 2018 Incoming Control Channel Authentication: Using 256 bit message hash 'SHA256' for HMAC authentication  
Tue Nov 13 18:38:31 2018 TCP/UDP: Preserving recently used remote address: [AF_INET]192.168.1.13:1194  
Tue Nov 13 18:38:31 2018 Socket Buffers: R=[65536->65536] S=[65536->65536]  
Tue Nov 13 18:38:31 2018 UDP link local: (not bound)  
Tue Nov 13 18:38:31 2018 UDP link remote: [AF_INET]192.168.1.13:1194  
Tue Nov 13 18:38:31 2018 MANAGEMENT: >STATE:1542130711,WAIT,,,,,  
Tue Nov 13 18:38:31 2018 MANAGEMENT: >STATE:1542130711,AUTH,,,,,  
Tue Nov 13 18:38:31 2018 TLS: Initial packet from [AF_INET]192.168.1.13:1194, sid=8974c69b c3a45d9e  
Tue Nov 13 18:38:31 2018 VERIFY OK: depth=1, C=US, ST=CA, L=SanFrancisco, O=Fort-Funston, OU=EASJ, CN=Fort-Funston CA,  
name=server, emailAddress=micl@easj.dk  
Tue Nov 13 18:38:31 2018 VERIFY KU OK  
Tue Nov 13 18:38:31 2018 Validating certificate extended key usage  
Tue Nov 13 18:38:31 2018 ++ Certificate has EKU (str) TLS Web Server Authentication, expects TLS Web Server Authentication  
Tue Nov 13 18:38:31 2018 VERIFY EKU OK  
Tue Nov 13 18:38:31 2018 VERIFY OK: depth=0, C=US, ST=CA, L=SanFrancisco, O=Fort-Funston, OU=EASJ, CN=server,  
name=server, emailAddress=micl@easj.dk  
Tue Nov 13 18:38:31 2018 Control Channel: TLSv1.2, cipher TLSv1.2 DHE-RSA-AES256-GCM-SHA384, 2048 bit RSA  
Tue Nov 13 18:38:31 2018 [server] Peer Connection Initiated with [AF_INET]192.168.1.13:1194  
Tue Nov 13 18:38:32 2018 MANAGEMENT: >STATE:1542130712,GET_CONFIG,,,,,  
Tue Nov 13 18:38:32 2018 SENT CONTROL [server]: 'PUSH_REQUEST' (status=1)  
Tue Nov 13 18:38:32 2018 PUSH: Received control message: 'PUSH_REPLY,route 10.8.0.1,topology net30,ping 10,ping-restart  
120,ifconfig 10.8.0.6 10.8.0.5'  
Tue Nov 13 18:38:32 2018 OPTIONS IMPORT: timers and/or timeouts modified  
Tue Nov 13 18:38:32 2018 OPTIONS IMPORT: --ifconfig/up options modified  
Tue Nov 13 18:38:32 2018 OPTIONS IMPORT: route options modified  
Tue Nov 13 18:38:32 2018 Outgoing Data Channel: Cipher 'AES-128-CBC' initialized with 128 bit key  
Tue Nov 13 18:38:32 2018 Outgoing Data Channel: Using 256 bit message hash 'SHA256' for HMAC authentication  
Tue Nov 13 18:38:32 2018 Incoming Data Channel: Cipher 'AES-128-CBC' initialized with 128 bit key  
Tue Nov 13 18:38:32 2018 Incoming Data Channel: Using 256 bit message hash 'SHA256' for HMAC authentication  
Tue Nov 13 18:38:32 2018 interactive service msg_channel=0  
Tue Nov 13 18:38:32 2018 ROUTE_GATEWAY 192.168.1.1/255.255.255.0 I=2 HWADDR=44:85:00:ce:48:66  
Tue Nov 13 18:38:32 2018 open_tun  
Tue Nov 13 18:38:32 2018 TAP-WIN32 device [MyTap] opened: \\.\Global\{E9AC3723-8C63-437E-83B7-4E53829D8D6F}.tap  
Tue Nov 13 18:38:32 2018 TAP-Windows Driver Version 9.21  
Tue Nov 13 18:38:32 2018 Notified TAP-Windows driver to set a DHCP IP/netmask of 10.8.0.6/255.255.255.252 on interface  
{E9AC3723-8C63-437E-83B7-4E53829D8D6F} [DHCP-serv: 10.8.0.5, lease-time: 31536000]  
Tue Nov 13 18:38:32 2018 Successful ARP Flush on interface [26] {E9AC3723-8C63-437E-83B7-4E53829D8D6F}  
Tue Nov 13 18:38:32 2018 do_ifconfig, tt->did_ifconfig_ipv6_setup=0  
Tue Nov 13 18:38:32 2018 MANAGEMENT: >STATE:1542130712,ASSIGN_IP,,10.8.0.6,,,,  
Tue Nov 13 18:38:37 2018 TEST ROUTES: 1/1 succeeded len=1 ret=1 a=0 u/d=up  
Tue Nov 13 18:38:37 2018 MANAGEMENT: >STATE:1542130717,ADD_ROUTES,,,,,  
Tue Nov 13 18:38:37 2018 C:\WINDOWS\system32\route.exe ADD 10.8.0.1 MASK 255.255.255.255 10.8.0.5  
Tue Nov 13 18:38:37 2018 ROUTE: CreateIpForwardEntry succeeded with dwForwardMetric1=35 and dwForwardType=4  
Tue Nov 13 18:38:37 2018 Route addition via IPAPI succeeded [adaptive]  
Tue Nov 13 18:38:37 2018 WARNING: this configuration may cache passwords in memory -- use the auth-nocache option to prevent  
this  
Tue Nov 13 18:38:37 2018 Initialization Sequence Completed  
Tue Nov 13 18:38:37 2018 MANAGEMENT: >STATE:1542130717,CONNECTED,SUCCESS,10.8.0.6,192.168.1.13,1194,,
```

Tue Nov 13 19:38:31 2018 TLS: soft reset sec=0 bytes=97973/-1 pkts=889/0  
Tue Nov 13 19:38:31 2018 VERIFY OK: depth=1, C=US, ST=CA, L=SanFrancisco, O=Fort-Funston, OU=EASJ, CN=Fort-Funston CA, name=server, emailAddress=micl@easj.dk  
Tue Nov 13 19:38:31 2018 VERIFY KU OK  
Tue Nov 13 19:38:31 2018 Validating certificate extended key usage  
Tue Nov 13 19:38:31 2018 ++ Certificate has EKU (str) TLS Web Server Authentication, expects TLS Web Server Authentication  
Tue Nov 13 19:38:31 2018 VERIFY EKU OK  
Tue Nov 13 19:38:31 2018 VERIFY OK: depth=0, C=US, ST=CA, L=SanFrancisco, O=Fort-Funston, OU=EASJ, CN=server, name=server, emailAddress=micl@easj.dk  
Tue Nov 13 19:38:31 2018 Outgoing Data Channel: Cipher 'AES-128-CBC' initialized with 128 bit key  
Tue Nov 13 19:38:31 2018 Outgoing Data Channel: Using 256 bit message hash 'SHA256' for HMAC authentication  
Tue Nov 13 19:38:31 2018 Incoming Data Channel: Cipher 'AES-128-CBC' initialized with 128 bit key  
Tue Nov 13 19:38:31 2018 Incoming Data Channel: Using 256 bit message hash 'SHA256' for HMAC authentication  
Tue Nov 13 19:38:31 2018 Control Channel: TLSv1.2, cipher TLSv1.2 DHE-RSA-AES256-GCM-SHA384, 2048 bit RSA