How to set up OpenVPN Server on HH5a with OpenWrt 21.02

based on OpenWrt wiki article written by ‘vgaetera’ as of December 2021

Document revision history:

```
v0.2b (8 Aug 2022)    - Verified working with 22.03.0-rc6
v0.2  (24 Dec 2021)   -
v0.1  (20 Dec 2021)   - Created by ‘bill’.
```

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1. Introduction

This is a supplement to the 'OpenWrt/LEDE Installation Guide for the BT Home Hub 5A' modem-router. It describes how to install and configure the OpenVPN server. Although this guide was written with the HH5a in mind, the instructions should work with all other makes and models of OpenWrt routers too.

This document is written for OpenWrt 21 and supplements the OpenWrt wiki instructions for OpenWrt server installation, which I believe was created and is maintained by OpenWrt member '**vgaetera**'.

This guide is written with Microsoft Windows users in mind and is correct as of December 2021.

For HH5a owners, allow at least **90** minutes to complete all these steps.

The OpenWrt OpenVPN server wiki instructions do not work with previous major releases of OpenWrt when tested as of 24 December 2021. The generated OpenVPN files are missing `tls-crypt-v2` sections due to a bug. The wiki article offers a link to an older version of the wiki article which does work with OpenWrt 19.07 when tested.

For Windows users, please refer to section 10 of the 'OpenWrt/LEDE installation guide for HH5a' for quick guide to using PuTTY, Notepad++, and WinSCP.

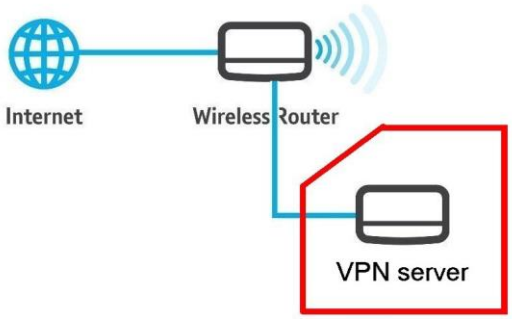
Speed test results using www.speedtest.net for some routers I have tested over **ethernet** connection:

Device	OpenWrt	SoC	OpenVPN speed
BT Home Hub 5A	21.02.1	500 MHz MIPS VRX268	9 Mbps
Linksys EA6350 v3	21.02.1	710 MHz ARM IPQ4018	25 Mbps

Note that some internet providers, especially mobile phone services, may operate Carrier Grade NAT (CGNAT), where same IP address is shared by multiple customers. The OpenVPN server is unlikely to work with CGNAT. Contact the service provider to request a non-CGNAT connection if they are able to offer it.

2. Installing the OpenVPN Server

2.1 Configuring LAN and WAN interfaces



The HH5a is an 'underpowered' modem-router with OpenVPN throughput unlikely to exceed 9 mbps. For this reason, this tutorial shows how to install a separate HH5a OpenVPN server wired to an existing ISP facing router.

Advice is included where there is only a single OpenWrt router which connects to the internet and will also host the OpenVPN server.

To install OpenVPN server, a working internet connection is required. The red WAN port on the HH5A will be be enabled for this purpose, so it can be connected to an existing router for internet access.

Example configuration:

```
Main ISP router LAN IP address            192.168.1.1
HH5a VPN server LAN IP address            192.168.111.1
HH5a VPN server static WAN IP address     192.168.1.209
OpenWrt 21 or later.
```

It is recommended to factory reset the HH5a.

Power on the HH5a and wait a few minutes. Press and hold the Reset button on the back of the HH5A for at least 10 seconds. Release the button when the main power light starts blinking rapidly in red colour. When the colour changes to a constant green colour, the factory reset is complete.

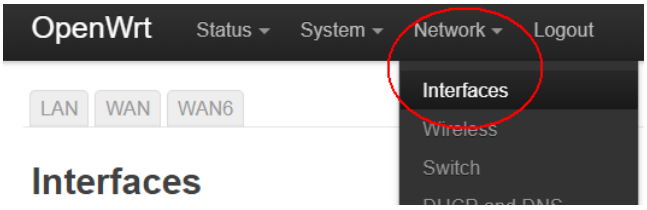
Alternatively, navigate to **LuCI -> System -> Backup/Flash Firmware** menu. Click on **Perform Reset** button.

Edit default LAN IP address

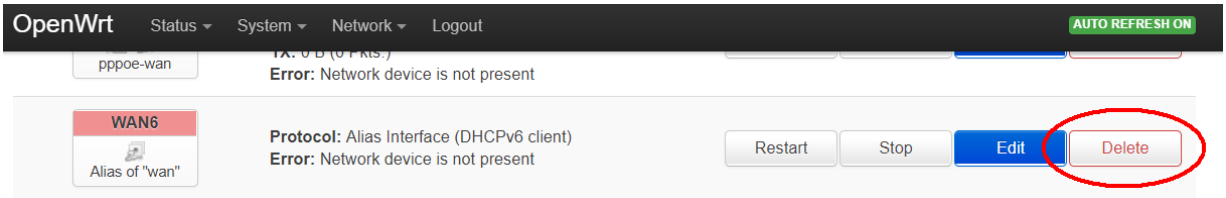
Connect a computer to one of the yellow LAN sockets on the HH5a with an Ethernet cable, and use a web browser and go to 192.168.1.1 and log into LUCI web admin.

Do **not** connect anything to the red WAN port at this time.

In LuCI and go to `Network -> Interfaces`.



IPv6 is beyond the scope of this document, so you may wish to delete the `WAN6` interface.



Press '`Save & Apply`' button at the bottom of the page.

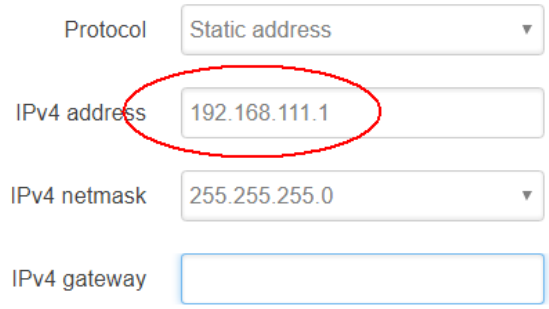
Navigate to `Network -> Interfaces -> LAN`.

Click on '`Edit`' button.

IMPORTANT:

If necessary, change the LAN IP address of the HH5a to use a different subnet (eg. `192.168.111.x`). Do **NOT** use the same subnet, such as `192.168.1.x`, on both WAN and LAN interfaces.

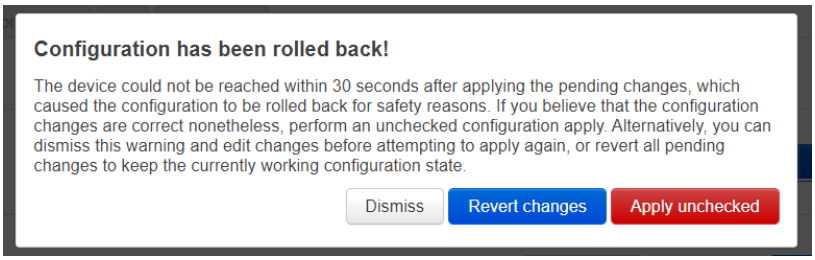
This example shows `192.168.111.1` assigned to the LAN interface of the HH5A.



Press '`Save`' button.

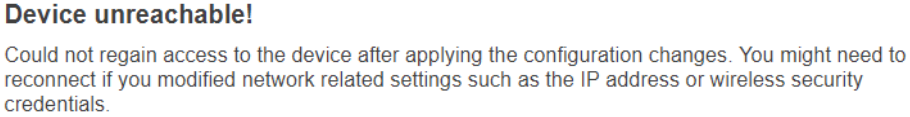
Press '`Save & Apply`' button at bottom of the page.

The following prompt will appear after 30 seconds.



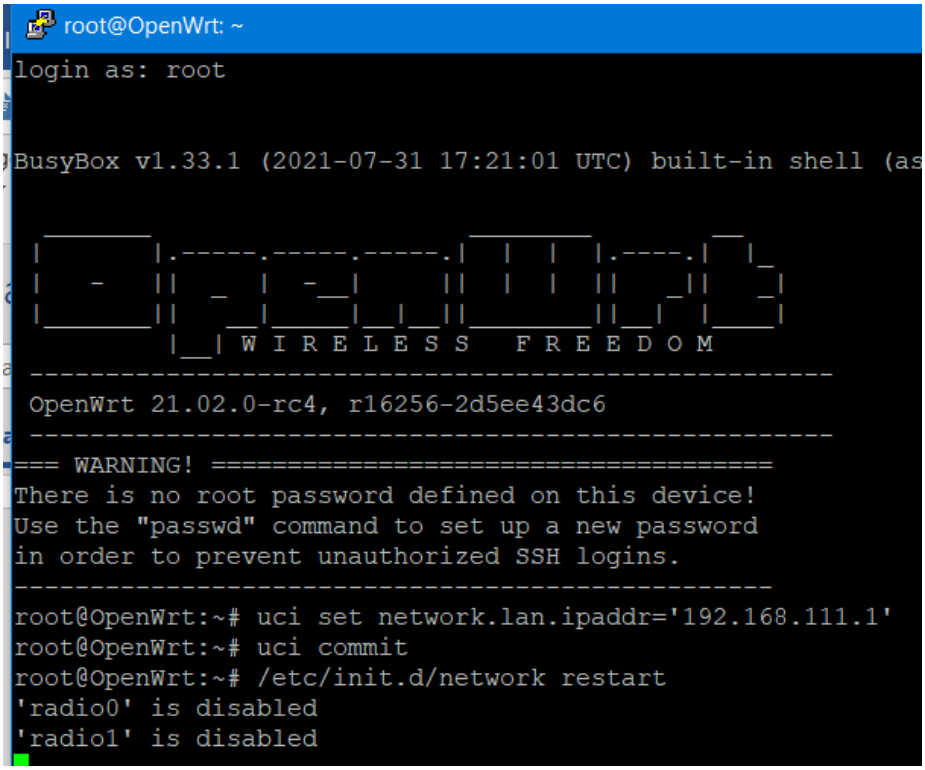
Simply click on the `Apply unchecked` button to continue.

After another 30 seconds has elapsed, the following message is likely to appear, to confirm the IP address has successfully changed.



If you are unable to change the LAN IP address using LuCI (An issue I've frequently encountered since this annoying Rollback feature was first introduced in OpenWrt 18), it can be changed by SSH into the router, and executing the following commands. Just copy and paste all 3 lines into PuTTY.

```
uci set network.lan.ipaddr='192.168.111.1'
uci commit
/etc/init.d/network restart
```



Press the `Enter/Return` key to ensure the commands have been executed.

You may need to unplug the Ethernet cable between the PC and the HH5a a couple of times to encourage the PC to drop its former 192.168.1.x IP address, and acquire a new 192.168.111.x IP address.

Now point a web browser to 192.168.111.1 and log into LuCI.

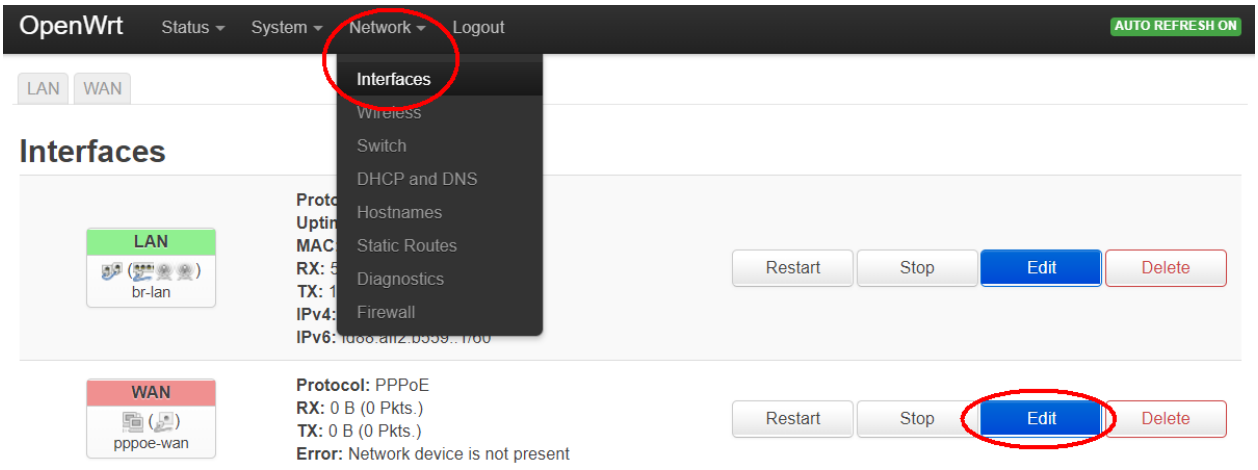
If you wish to install OpenVPN server directly onto a single fully functioning ISP facing router running OpenWrt, you can skip the following steps, and jump straight to configuring DDNS or section 2.2, downloading and installing the OpenVPN server package.

Edit WAN settings

The next step is to edit the `WAN interface` settings.

Navigate to `Network -> Interfaces -> WAN`.

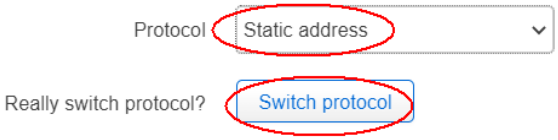
For the '`WAN`' interface, click '`Edit`'.



The default protocol for most routers is '`DHCP client`', but as the HH5a is a modem-router, its default is '`PPPoE`'.

As this will be a server it is recommended to change the Protocol to use '`Static Address`'.

Click on '`Switch Protocol`' button.



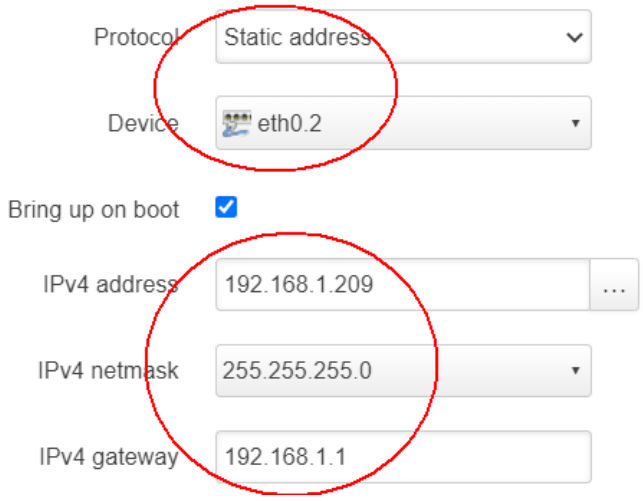
Press '`Save`' button.

Press '`Save & Apply`' button at the bottom of the page.

For '`Static address`', complete the remaining fields.

For this example, the main ISP facing router has LAN IP address `192.168.1.1`, and `192.168.1.209` is unlikely to be in use, so has been chosen for the HH5a WAN interface. `8.8.8.8` is Google's DNS server. Use these settings:

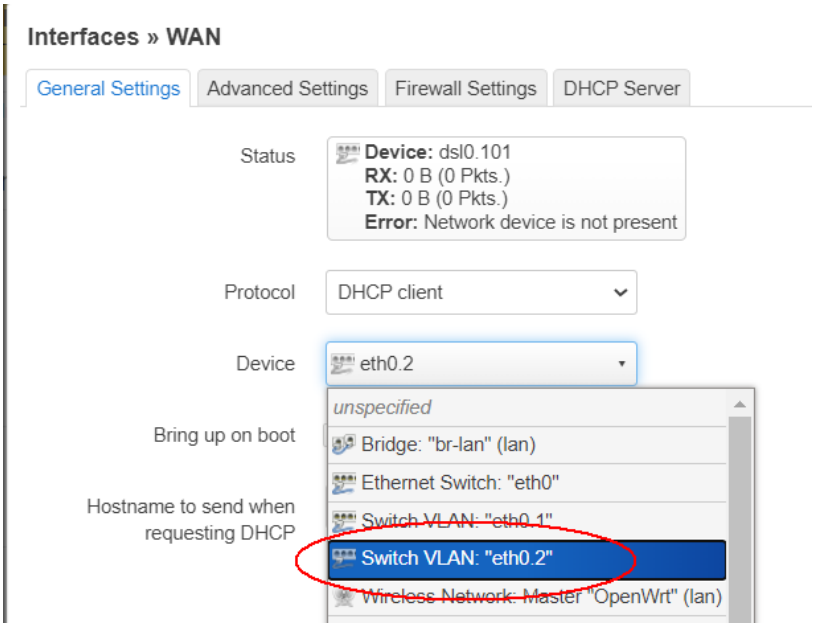
IPv4 address: `192.168.1.209`
IPv4 gateway: `192.168.1.1` (ie. the LAN IP address of your ISP facing router)
DNS servers: `8.8.8.8 and 8.8.4.4` (Google servers)



Modem-router Owners Only:

This is specific to routers which possess a Lantiq based DSL modem. For all other cable routers, you can review and skip past the following step.

Next select device called '`eth0.2`' for the HH5a modem-router, click on '`Device`' pull down.



Press 'Save' button.

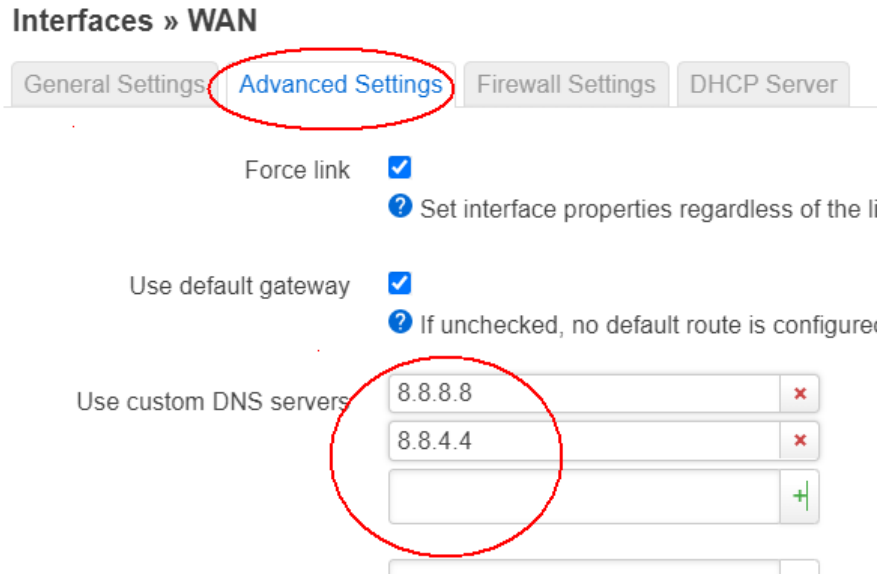
Press 'Save & Apply' button at the bottom of the page.

All router owners:

Navigate to Network -> Interfaces -> WAN.

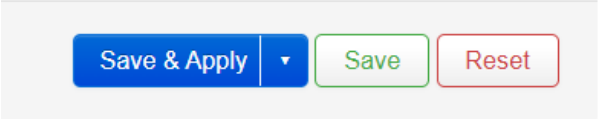
For the 'WAN' interface, click 'Edit'.

Click on 'Advanced Settings' tab



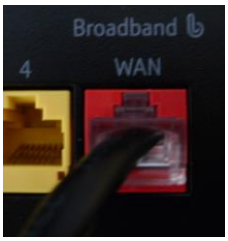
Press 'Save' button.

Press 'Save & Apply' button at the bottom of the page.



For HH5a owners, complete the steps described in section 3 to disable DSL_Control. This is **very important** to ensure the HH5a does not randomly reboot when completing the lengthy procedure described in the following pages.

The next step is to download and install the OpenVPN server packages.



Connect an Ethernet cable from the red ethernet WAN port of the HH5a to a vacant LAN socket on your internet wired router.

Verify there is internet access by browsing websites and running a speed test before proceeding any further.

DDNS

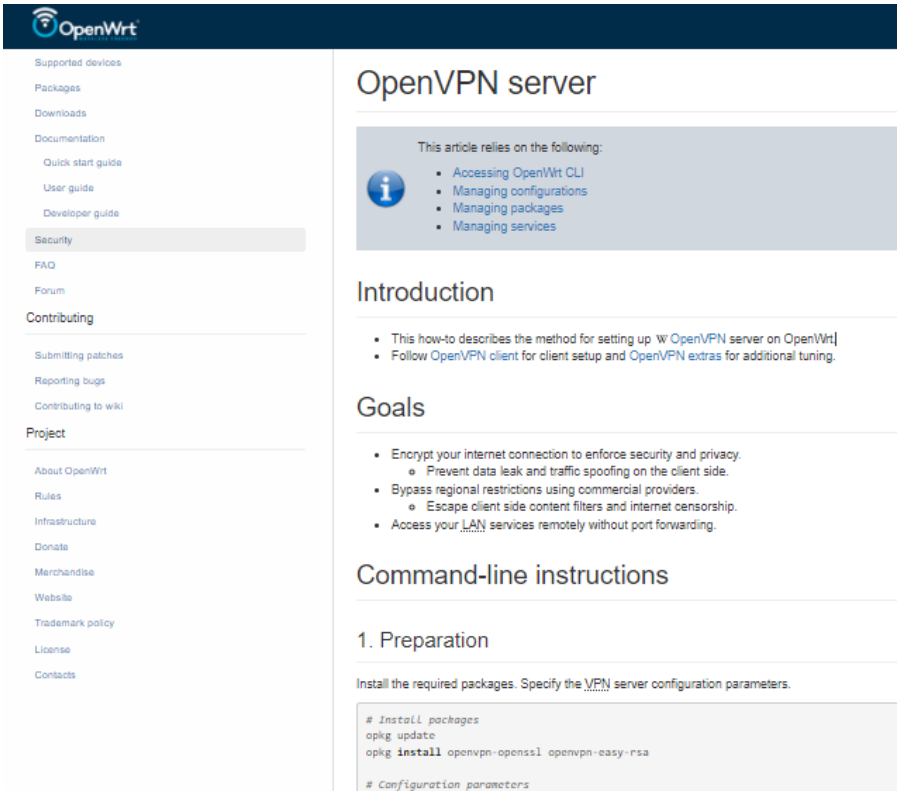
If your ISP does not provide a static address, then consider installing DDNS on your ISP facing internet router if possible.

Alternatively, see section 9.16 of the 'OpenWrt/LEDE installation guide for HH5a' to set up the free DuckDNS service on this HH5a OpenVPN server.

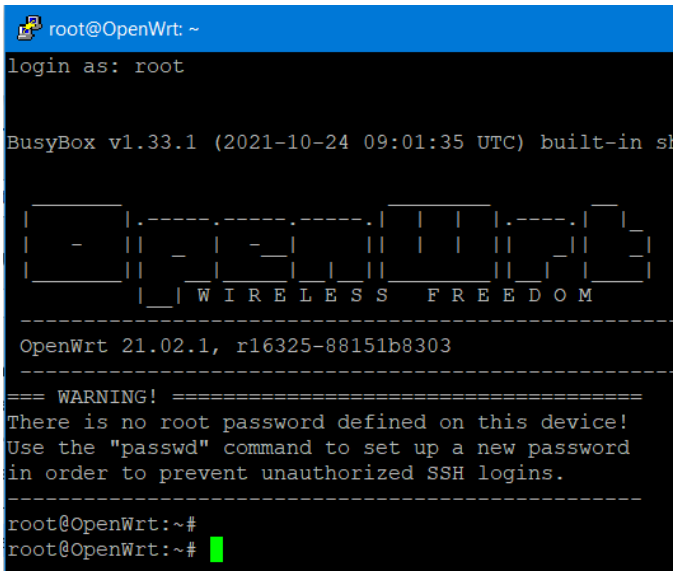
2.2 Downloading and configuring OpenVPN server

Next to follow the steps published in the OpenWrt wiki. For beginners, the command line method looks very daunting at first, but in reality it is pretty much a simple 'copy and paste' exercise.

https://OpenWrt.org/docs/guide-user/services/vpn/openvpn/server



Use PuTTY to SSH into the HH5a at its LAN IP address. eg. `192.168.111.1`



Quick installation method

This is only for OpenWrt 21.02. If you wish to install OpenVPN server on a previous version of OpenWrt such as OpenWrt 19.07, please refer to the link in the wiki page for an older version of the article.

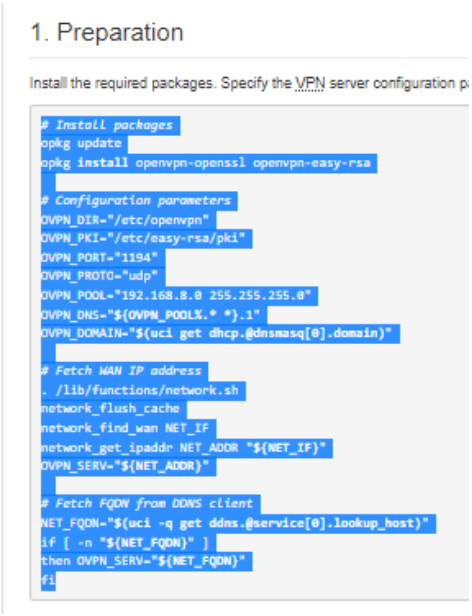
ie. https://OpenWrt.org/docs/guide-user/services/vpn/openvpn/server?rev=1632708683

There are four batches of commands to be executed. They are for:

- Preparation
- Key Management
- Firewall
- VPN service

It is simply a matter of copy and pasting all the commands in each section into PuTTY.

eg. you could choose to blindly highlight and copy all the commands listed within the 'Preparation' section (including the comments with lines beginning with #) from the OpenWrt wiki page, and paste them into PuTTY to execute.


1. Preparation

Install the required packages. Specify the VPN server configuration p

```
# Install packages
opkg update
opkg install openvpn-openssl openvpn-easy-rsa

# Configuration parameters
OVPN_DIR="/etc/openvpn"
OVPN_PKI="/etc/easy-rsa/pki"
OVPN_PORT="1194"
OVPN_PROTO="udp"
OVPN_POOL="192.168.8.0 255.255.255.0"
OVPN_DNS="${OVPN_POOL%.* *).1"
OVPN_DOMAIN="$(uci get dhcp.@dnsmasq[0].domain)"

# Fetch WAN IP address
. /lib/functions/network.sh
network_flush_cache
network_find_wan NET_IF
network_get_ipaddr NET_ADDR "${NET_IF}"
OVPN_SERV="${NET_ADDR}"

# Fetch FQDN from DDNS client
NET_FQDN="$(uci -q get ddns.@service[0].lookup_host)"
if [ -n "${NET_FQDN}" ]
then OVPN_SERV="${NET_FQDN}"
fi
```

(Do not try to highlight, copy and paste from above image. It will not work)

However, I found during brief testing, some commands may fail. For example, if the '`opkg update`' fails early in the script, it causes other commands such as '`opkg install`' to fail within the '`Preparation`' list of commands. Re-running the commands seems to resolve the problem.

For this reason and educational purposes, this guide will break down each batch of commands into smaller tasks, so you can observe the results as they are executed.

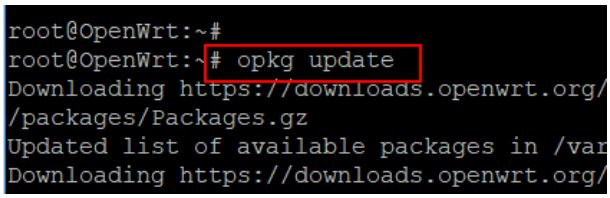
Preparation

Execute the two commands to download the required packages, by highlighting the first command from the OpenWrt wiki page as shown below.

```
# Install packages
opkg update
opkg install openvpn-openssl openvpn-easy-rsa
```

Do not try to highlight, copy and paste from above image. It will not work.

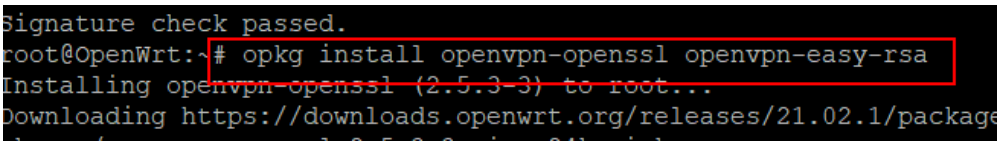
Now Copy the highlighted single '`opkg update`' command line. To paste the command into PuTTY, simply move the mouse pointer to anywhere in the black space within the PuTTY screen and click on the right mouse or trackpad button.



Press the `Enter/Return` key to ensure the command has been successfully completed.

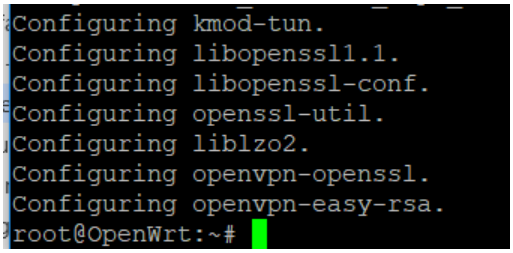
Repeat the process. Copy and paste the next `opkg install` command line.

```
# Install packages
opkg update
opkg install openvpn-openssl openvpn-easy-rsa
```



Press the `Enter/Return` key to ensure the command has been successfully completed.

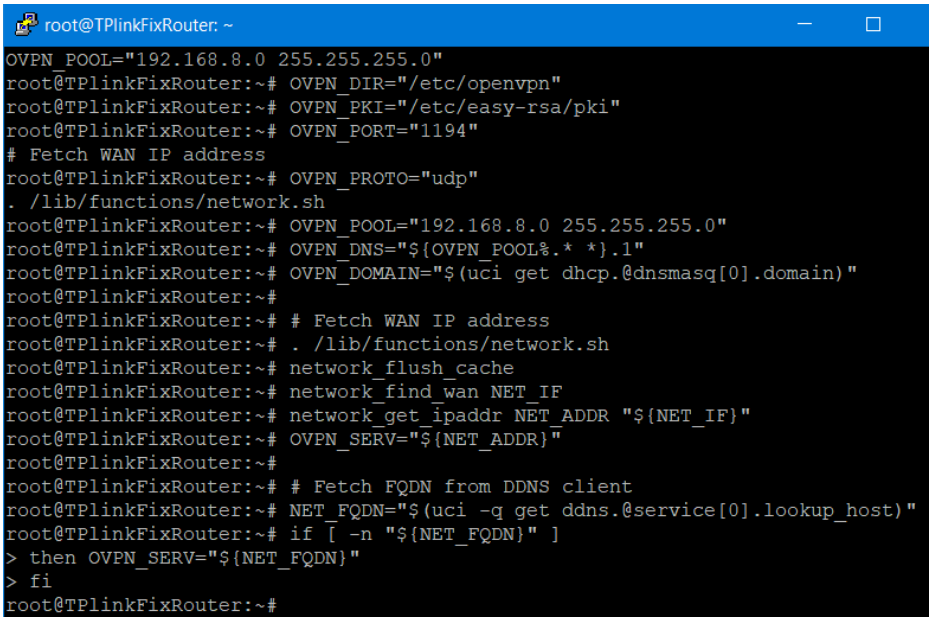
The following should appear if the packages have been successfully installed.



Next highlight the remainder of the Preparation commands as shown below, and copy and paste all lines shown below in one go. (No need to copy and paste each line individually).

The wiki presumes standard `UDP` protocol and port number `1194` will be used. (Alternative is `TCP` protocol and port `443` as used for HTTPS traffic)

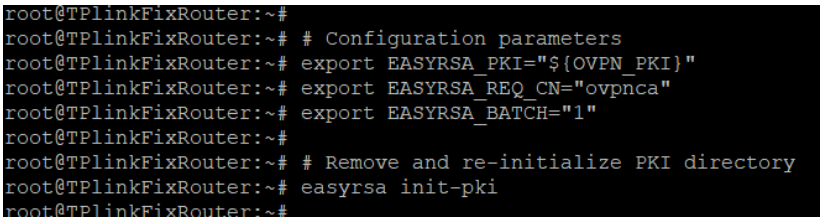
```
# Install packages
opkg update
opkg install openvpn-openssl openvpn-easy-rsa

# Configuration parameters
OVPN_DIR="/etc/openvpn"
OVPN_PKI="/etc/easy-rsa/pki"
OVPN_PORT="1194"
OVPN_PROTO="udp"
OVPN_POOL="192.168.8.0 255.255.255.0"
OVPN_DNS="${OVPN_POOL%.* *}.1"
OVPN_DOMAIN="$(uci get dhcp.@dnsmasq[0].domain)"

# Fetch WAN IP address
. /lib/functions/network.sh
network_flush_cache
network_find_wan NET_IF
network_get_ipaddr NET_ADDR "${NET_IF}"
OVPN_SERV="${NET_ADDR}"

# Fetch FQDN from DDNS client
NET_FQDN="$(uci -q get ddns.@service[0].lookup_host)"
if [ -n "${NET_FQDN}" ]
then OVPN_SERV="${NET_FQDN}"
fi
```



Press the `Enter/Return` key to ensure the command has been successfully completed.

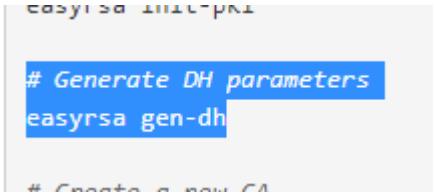
Key Management

Copy and paste the first 6 command lines as shown below



Press the `Enter/Return` key to ensure the command has been successfully completed.

Copy and paste this command

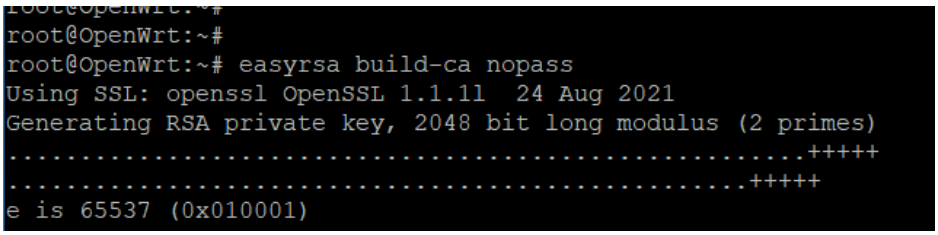


For the MIPs powered HH5a, the above step takes **55** minutes to complete on OpenWrt 21.02.1. By comparison, the ARM powered Linksys EA6350 v3 can complete same task in less 5 minutes on 21.02.1!

For OpenWrt 19.07.7, DH generation takes less than 20 minutes on HH5a.

Copy and paste the single line.

```
# Create a new CA
easyrsa build-ca nopass
```



Press the `Enter/Return` key to ensure the command has been successfully completed.

Copy and paste the single line.

```
# Generate server keys and certificate
easyrsa build-server-full server nopass
openvpn --genkey tls-crypt-v2-server ${EASYRSA_PKI}/private/server.pem
```

```
root@OpenWrt:~# easyrsa build-server-full server nopass
Using SSL: openssl OpenSSL 1.1.1l  24 Aug 2021
Generating a RSA private key
....+++++
.....................................................
writing new private key to '/etc/easy-rsa/pki/easy-rsa-132
-----
Using configuration from /etc/easy-rsa/pki/easy-rsa-13208.
Check that the request matches the signature
Signature ok
The Subject's Distinguished Name is as follows
commonName            :ASN.1 12:'server'
Certificate is to be certified until Mar 26 15:37:06 2024
Write out database with 1 new entries
Data Base Updated
```

Press the `Enter/Return` key to ensure the command has been successfully completed.

Copy and paste the next single line.

```
# Generate server keys and certificate
easyrsa build-server-full server nopass
openvpn --genkey tls-crypt-v2-server ${EASYRSA_PKI}/private/server.pem
```

```
root@OpenWrt:~# openvpn --genkey tls-crypt-v2-server ${EASYRSA_PKI}/private/serv
er.pem
root@OpenWrt:~#
```

Press the `Enter/Return` key to ensure the command has been successfully completed.

Copy and paste the single line.

```
# Generate client keys and certificate
easyrsa build-client-full client nopass
openvpn --tls-crypt-v2 ${EASYRSA_PKI}/private/server.pem \
--genkey tls-crypt-v2-client ${EASYRSA_PKI}/private/client.pem
```

```
root@OpenWrt:~# easyrsa build-client-full client nopass
Using SSL: openssl OpenSSL 1.1.1l  24 Aug 2021
Generating a RSA private key
..........+++++
...................+++++
writing new private key to '/etc/easy-rsa/pki/easy-rsa-132
-----
Using configuration from /etc/easy-rsa/pki/easy-rsa-13286.
Check that the request matches the signature
Signature ok
The Subject's Distinguished Name is as follows
commonName            :ASN.1 12:'client'
Certificate is to be certified until Mar 26 15:40:04 2024

Write out database with 1 new entries
Data Base Updated
```

Press the `Enter/Return` key to ensure the command has been successfully completed.

Copy and paste the next VERY LONG single command line.

```
# Generate client keys and certificate
easyrsa build-client-full client nopass
openvpn --tls-crypt-v2 ${EASYRSA_PKI}/private/server.pem \
--genkey tls-crypt-v2-client ${EASYRSA_PKI}/private/client.pem
```

```
root@OpenWrt:~# openvpn --tls-crypt-v2 ${EASYRSA_PKI}/private/server.pem \
> --genkey tls-crypt-v2-client ${EASYRSA_PKI}/private/client.pem
root@OpenWrt:~#
```

Press the `Enter/Return` key to ensure the command has been successfully completed.

Firewall

Copy and paste ALL of the commands.

```
# Configure firewall
uci rename firewall.@zone[0]="lan"
uci rename firewall.@zone[1]="wan"
uci del_list firewall.lan.device="tun+"
uci add_list firewall.lan.device="tun+"
uci -q delete firewall.ovpn
uci set firewall.ovpn="rule"
uci set firewall.ovpn.name="Allow-OpenVPN"
uci set firewall.ovpn.src="wan"
uci set firewall.ovpn.dest_port="${OVPN_PORT}"
uci set firewall.ovpn.proto="${OVPN_PROTO}"
uci set firewall.ovpn.target="ACCEPT"
uci commit firewall
/etc/init.d/firewall restart
```

```
root@OpenWrt:~# uci rename firewall.@zone[0]="lan"
uci rename firewall.@zone[1]="wan"
uci del_list firewall.lan.device="tun+"
uci add_list firewall.lan.device="tun+"
uci -q delete firewall.ovpn
uci set firewall.ovpn="rule"
uci set firewall.ovpn.name="Allow-OpenVPN"
uci set firewall.ovpn.src="wan"
uci set firewall.ovpn.dest_port="${OVPN_PORT}"
uci set firewall.ovpn.proto="${OVPN_PROTO}"
uci set firewall.ovpn.target="ACCEPT"
uci commit firewall
/etc/init.d/firewall restart
```

Press the `Enter/Return` key to ensure the command has been successfully completed.

The following should appear on execution for OpenWrt 21.02:

Added: Nothing will be returned for OpenWrt 22.03.0-rc6 when tested.

```
   * Zone 'lan'
   * Zone 'wan'
 * Populating IPv6 mangle table
   * Zone 'lan'
   * Zone 'wan'
 * Set tcp_ecn to off
 * Set tcp_syncookies to on
 * Set tcp_window_scaling to on
 * Running script '/etc/firewall.user'
root@OpenWrt:~#
```

(fyi, `Allow-OpenVPN` rule will appear in 'Traffic Rules' in 'Firewall' menu in LUCI)

VPN Service

Copy and paste ALL of the commands.

Starts with

```
root@OpenWrt:~#
root@OpenWrt:~# umask go=
root@OpenWrt:~# OVPN_DH="$(cat ${OVPN_PKI}/dh.pem)"
OVPN_CA="$(openssl x509 -in ${OVPN_PKI}/ca.crt)"
ls ${OVPN_PKI}/issued \
| sed -e "s/\.\w*$//" \
| while read -r OVPN_ID
do
root@OpenWrt:~# OVPN_CA="$(openssl x509 -in ${OVPN_PKI}/c
OVPN_TC="$(cat ${OVPN_PKI}/private/${OVPN_ID}.pem)"
OVPN_KEY="$(cat ${OVPN_PKI}/private/${OVPN_ID}.key)"
OVPN_CERT="$(openssl x509 -in ${OVPN_PKI}/issued/${OVPN_I
OVPN_EKU="$(echo "${OVPN_CERT}" | openssl x509 -noout -pu
case ${OVPN_EKU} in
```

Finishes with:

```
> <cert>
> ${OVPN_CERT}
> </cert>
> <ca>
> ${OVPN_CA}
> </ca>
> EOF
> done
root@OpenWrt:~# /etc/init.d/openvpn restart
root@OpenWrt:~# ls ${OVPN_DIR}/*.ovpn
/etc/openvpn/client.ovpn
root@OpenWrt:~#
```

Press the `Enter/Return` key to ensure the command has been successfully completed.

If you are installing OpenVPN server directly onto a single fully functioning ISP facing router running OpenWrt, you can skip section 2.3, and jump to section 2.4, retrieving and editing the client.ovpn file.

2.3 Configure Port forwarding rule on ISP facing router

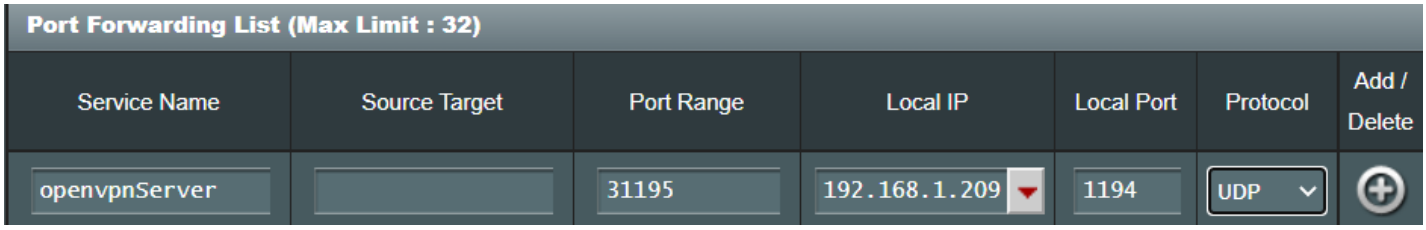
As the HH5a is behind another 'router', the next step is to configure a firewall rule on the ISP facing router. This will allow openvpn clients from the internet to reach the OpenVPN server.

The following parameters are required:

IPv4 address of OpenVPN server WAN port	`192.168.1.209`	(for this example)
Port number	`1194`	(default)
Protocol	`UDP`	(default)

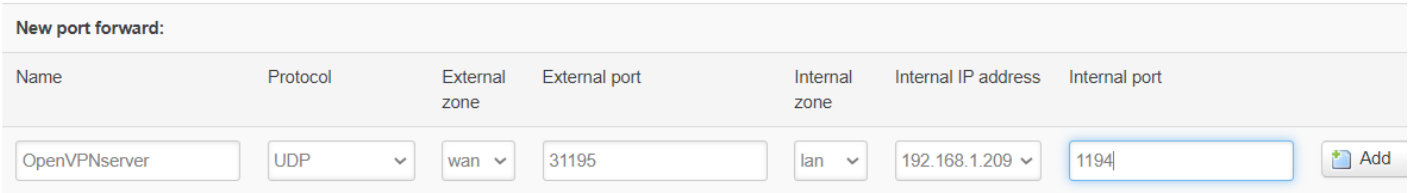
Note in these following examples, the `External Port` number has been deliberately changed from `1194` to `31195`. OpenVPN clients on the internet must use `UDP` protocol on port `31195` to connect to this OpenVPN server. You can of course choose to use default port no. `1194`.

AsusWRT router

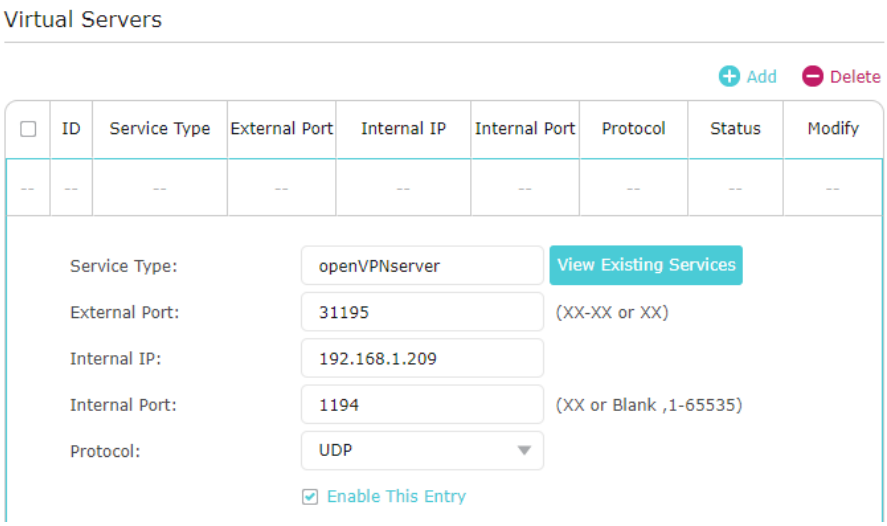


OpenWrt router

nb. This is **NOT** the HH5a running OpenVPN server!

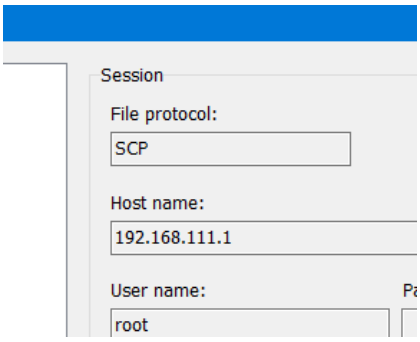


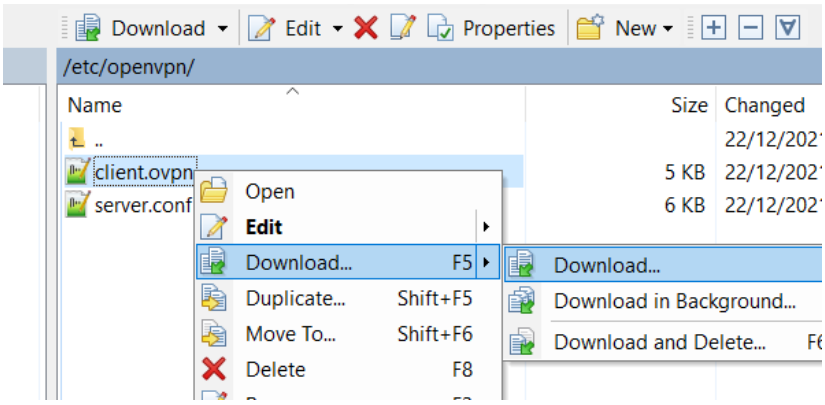
TPlink router



2.4 Download and editing the client ovpn file

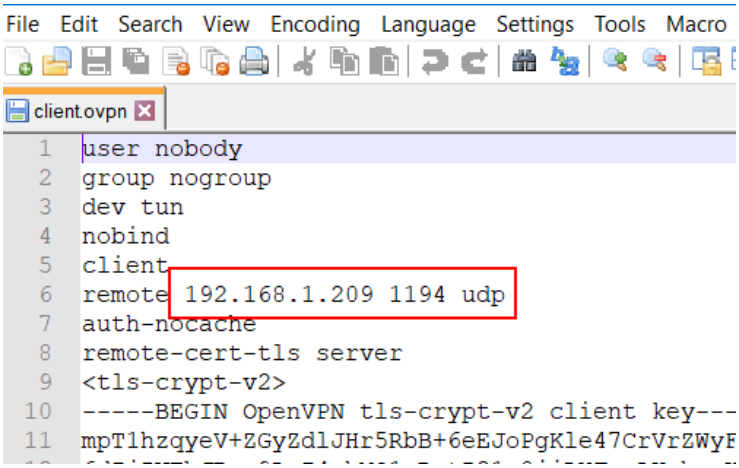
Use WinSCP to retrieve the `client.ovpn` file from the HH5a to a computer.





Use Notepad++ to open the `client.ovpn` file.

The WAN IP address of the HH5a (eg. `192.168.1.209`) and the default port number, `1194`, used by openvpn server may be visible.



The `IP address` and the `port number` contained within the original `client.ovpn` file should be modified where necessary.

If your ISP has assigned a static IP address to your internet connection, use that IP address.

If you use DDNS, enter the fully qualified domain name. eg. `mytestDNS.duckdns.org`

```
1  user nobody
2  group nogroup
3  dev tun
4  nobind
5  client
6  remote mytestDNS.duckdns.org 31195 udp
7  auth-nocache
8  remote-cert-tls server
9  <tls-crypt-v2>
10 -----BEGIN OpenVPN tls-crypt-v2 client key--
```

Don't forget to edit the port number if necessary! (eg. port 31195 in above example)

If you don't yet use DDNS, and you don't have a static IP address assigned by your ISP, you can obtain your current dynamic IP address assigned to your broadband connection by visiting websites such as `myip.com`

Enter the reported IP address into the `client.ovpn` file.

Warning: The dynamic IP address of your internet connection could change.

(see section 9.16 of the 'OpenWrt/LEDE installation guide for HH5a to set up the free DuckDNS service)

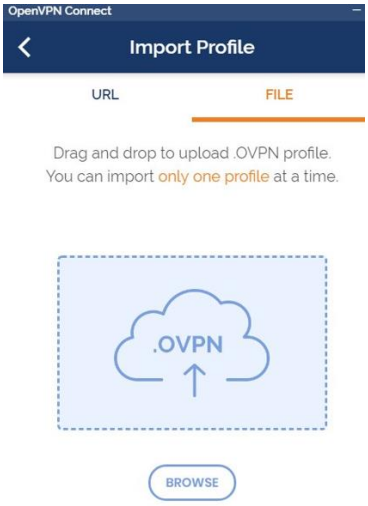
2.5 Configuring the OpenVPN Client

Microsoft Windows

Download and install the OpenVPN Connect for Windows client

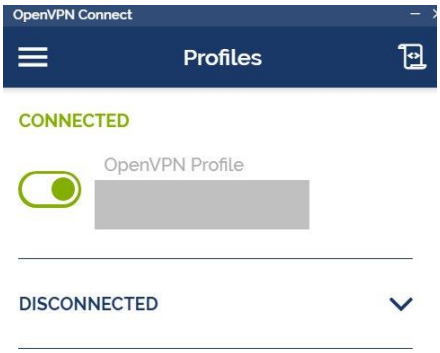
https://openvpn.net/client-connect-vpn-for-windows/

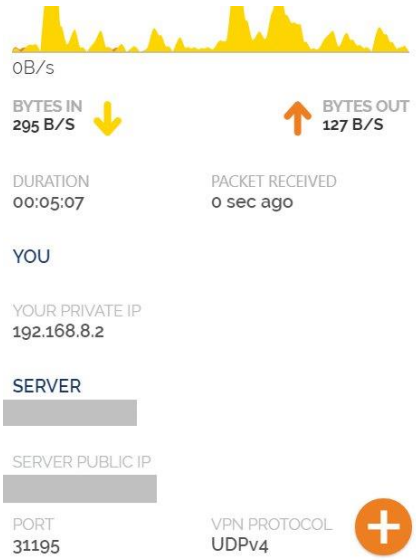
Start the OpenVPN Connect client and click on the '+' button to add an ovpn file.



Load the edited `client.ovpn` file and move the slider button to connect to the OpenVPN server.

Here is screen capture of a successful openvpn connection.

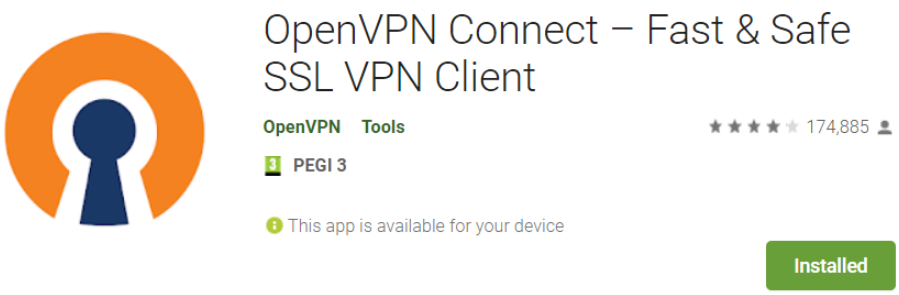




Observe the PC has a LAN IP address of `192.168.8.2` in this example. It is NOT on the same subnet `192.168.111.x` as the HH5a.

Android

Simply go to the Google Play store and install the OpenVPN Connect app.



Tip: for smartphone users, create an email and include the `client.ovpn` file as an attachment on the computer.

Open the email.

When you try to view the attachment, you will get an error. Click on button to save the file attachment to the phone's storage.

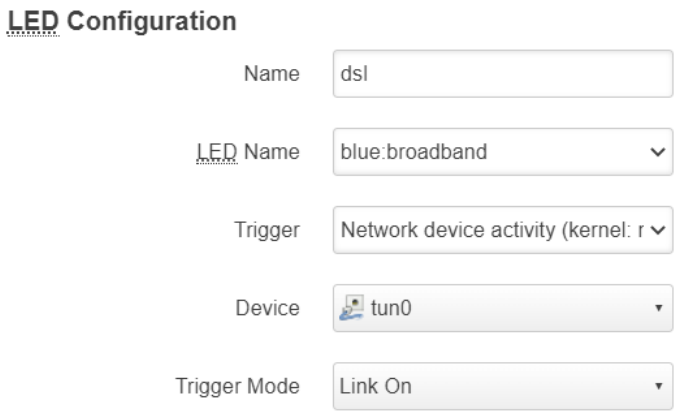
Launch the OpenVPN Connect app.

The `client.ovpn` file will probably be located in **'Internal Storage' > 'Download'** folder.

2.6 LED configuration

Go to `System -> LED Configuration` menu. You may wish to edit the existing LED configuration for 'Internet' as shown below. The 'b' (broadband) indicator will light up.

Edit the settings by renaming the original '`dsl`' LED configuration as shown below:



2.7 Frequently Asked Questions

Q. Can I use LuCI to manage the configured OpenVPN server configuration?

A. No. LuCI is not at this time compatible with the command-line method described in the OpenWrt wiki article.

Q. The maximum openvpn transfer speed is only 9Mbps. How can I increase the speed?

A. You could explore using Wireguard protocol. Otherwise, get a faster (and more expensive) router which supports OpenWrt, or consider alternatives such as Asus ARM powered routers using Broadcom SoC capable of running stock or RMerlin AsusWrt. Eg. RT-AC86u.

Q. The HH5a sits behind the ISP router. I can ping both the OpenVPN server and the ISP facing router LAN IP addresses, but I can't ping a Windows PC?

A. The Windows firewall on the PC is likely to be blocking icmp ping requests. Verify you can ping another device such as a printer on the same subnet as the Windows PC.

Q. I can connect to the OpenVPN server when my remote device is on the LAN, but when I try to connect from a remote location or using 4G/5G, it fails.

A. Check the IP address/hostname and the port number specified in the `client.ovpn` for errors. Also check port forwarding rule is correctly configured if the HH5a is behind an ISP router.

Q. Will the OpenVPN server operate on a Carrier Grade NAT (CGNAT) internet service?

A. No, to the best of my knowledge. CGNAT shares the same IP address with multiple customers. Contact the ISP to see if they offer a non-CGNAT solution.

Q. I am trying to follow the latest wiki instructions to install OpenVPN server onto OpenWrt 19.07, and it does not work. The OpenVPN client reports tls-crypt parsing error when trying to open the ovpn file.

A. Please refer to an older article to resolve the issue.

https://OpenWrt.org/docs/guide-user/services/vpn/openvpn/server?rev=1632708683

Q. Key generation is horrendously slow on HH5a, can I generate the keys on a faster PC and use them in OpenWrt?

A. Yes, see this thread for more information.

https://forum.openwrt.org/t/openvpn-server-generate-dh-parameters-on-pc-then-import-them-to-openwrt/150103

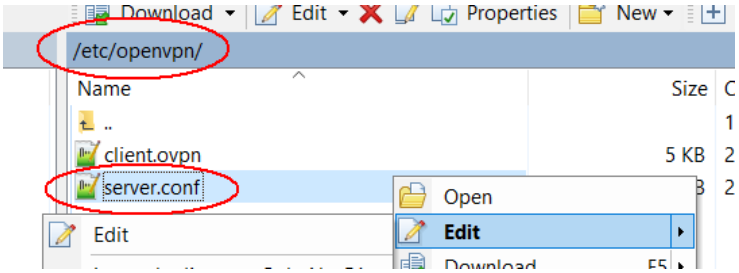
2.8 OpenWrt settings

From OpenWrt 21.02 installation.

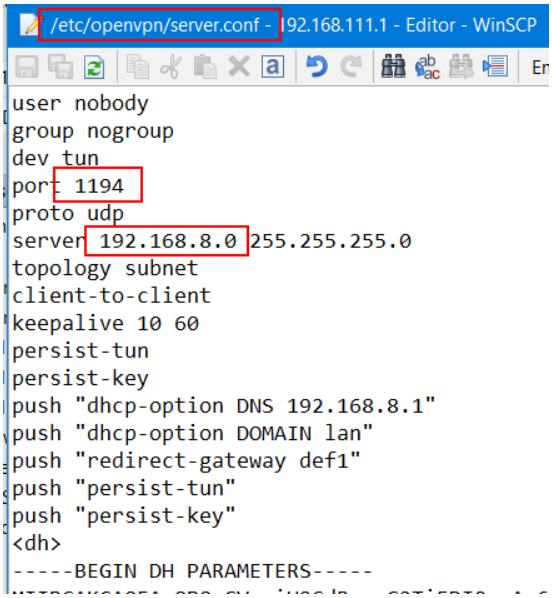
OpenVPN

See section 2.4 with regards to the `client.ovpn` settings file.

The openvpn server settings are found within `/etc/openvpn/server.conf`



Contents of `/etc/openvpn/server.conf`

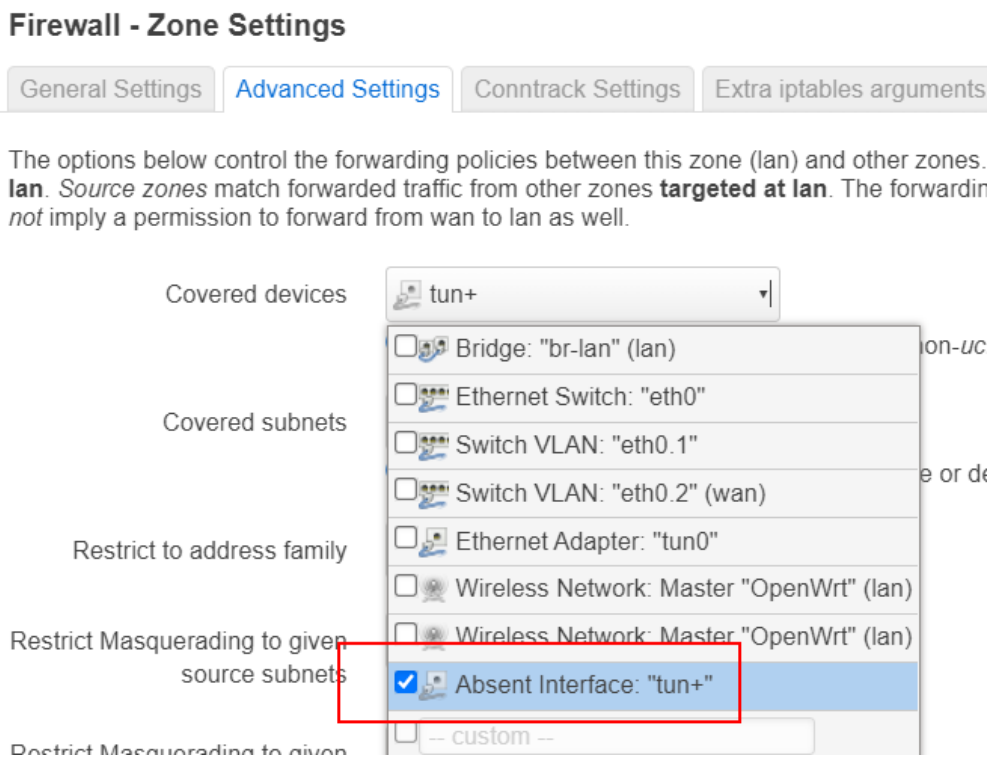


There is also the `/etc/config/openvpn` config file. As far as I'm aware, this is not used at all. TBC.

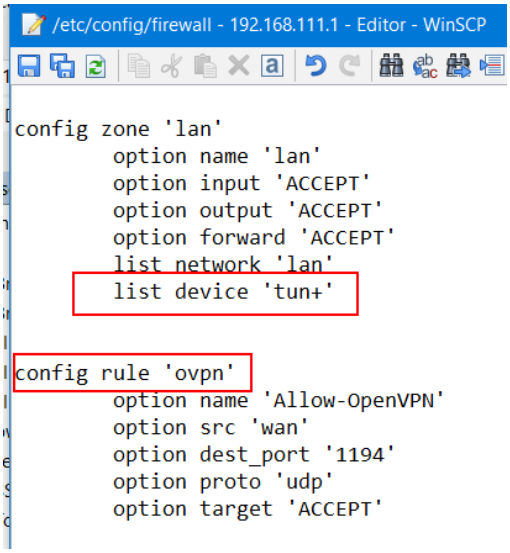
Firewall

Traffic Rule

LAN zone setting



Changes to `/etc/config/firewall` config file



System Log

Wed Dec 22 16:52:16 2021 daemon.warn openvpn(server)[1974]: --cipher is not set. Previous OpenVPN version defaulted to BF-CBC as fallback when cipher negotiation failed
Wed Dec 22 16:52:16 2021 daemon.notice openvpn(server)[1974]: OpenVPN 2.5.3 mips-openwrt-linux-gnu [SSL (OpenSSL)] [LZO] [LZ4] [EPOLL] [MH/PKTINFO] [AEAD]
Wed Dec 22 16:52:16 2021 daemon.notice openvpn(server)[1974]: library versions: OpenSSL 1.1.1l 24 Aug 2021, LZO 2.10
Wed Dec 22 16:52:16 2021 daemon.warn openvpn(server)[1974]: NOTE: your local LAN uses the extremely common subnet address 192.168.0.x or 192.168.1.x. Be aware tha
Wed Dec 22 16:52:16 2021 daemon.warn openvpn(server)[1974]: NOTE: the current --script-security setting may allow this configuration to call user-defined scripts
Wed Dec 22 16:52:17 2021 user.notice firewall: Reloading firewall due to ifup of lan (br-lan)
Wed Dec 22 16:52:17 2021 daemon.notice openvpn(server)[1974]: TUN/TAP device tun0 opened
Wed Dec 22 16:52:17 2021 daemon.notice openvpn(server)[1974]: net_iface_mtu_set: mtu 1500 for tun0
Wed Dec 22 16:52:17 2021 daemon.notice openvpn(server)[1974]: net_iface_up: set tun0 up
Wed Dec 22 16:52:17 2021 daemon.notice openvpn(server)[1974]: net_addr_v4_add: 192.168.8.1/24 dev tun0
Wed Dec 22 16:52:17 2021 daemon.notice openvpn(server)[1974]: /usr/libexec/openvpn-hotplug up server tun0 1500 1621 192.168.8.1 255.255.255.0 init
Wed Dec 22 16:52:17 2021 daemon.err odhcpd[1542]: Failed to send to ff02::1%lan@br-lan (Address not available)
Wed Dec 22 16:52:17 2021 daemon.warn openvpn(server)[1974]: Could not determine IPv4/IPv6 protocol. Using AF_INET
Wed Dec 22 16:52:17 2021 daemon.notice openvpn(server)[1974]: UDPv4 link local (bound): [AF_INET][undef]:1194
Wed Dec 22 16:52:17 2021 daemon.notice openvpn(server)[1974]: UDPv4 link remote: [AF_UNSPEC]
Wed Dec 22 16:52:17 2021 daemon.notice openvpn(server)[1974]: GID set to nogroup
Wed Dec 22 16:52:17 2021 daemon.notice openvpn(server)[1974]: UID set to nobody
Wed Dec 22 16:52:17 2021 daemon.notice openvpn(server)[1974]: Initialization Sequence Completed

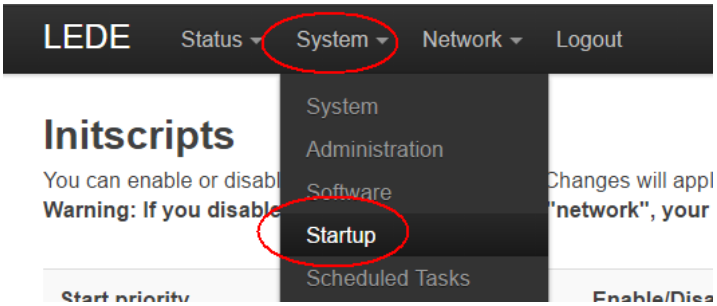
3. Bug fixes for Home Hub 5A

3.1 How to disable ‘dsl_control’ (DSL port)

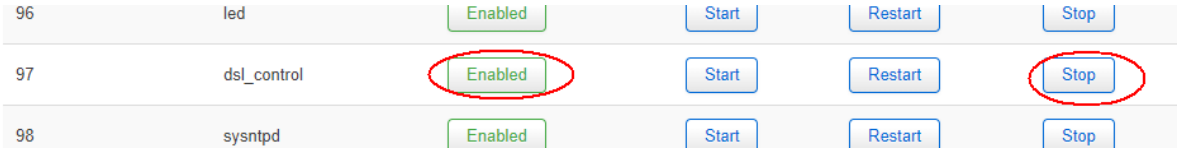
It appears when the DSL port is not being used, a bug in the VDSL app causes unexpected high load, and can eventually cause the HH5a to crash and reboot without warning. This usually occurs within an hour of starting the HH5A. This issue may also affect other modem routers with Lantiq SoC.

In the meantime, it is recommended to disable ‘`dsl_control`’ if the DSL port won’t be used.

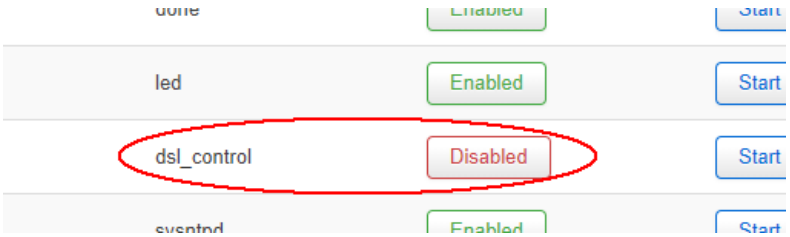
Start LUCI and navigate to `System -> Startup` menu



Scroll down until you find ‘`dsl_control`’. Then click on ‘`Enabled`’ and ‘`Stop`’ buttons.



Ensure that `Disabled` is displayed as shown below.



Optionally, shut down and restart the HH5a.

The DSL port is now disabled.

3.2 Random WAN port MAC address fix

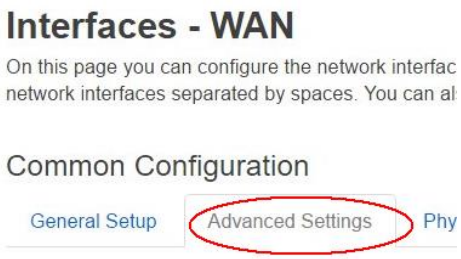
If the HH5a is configured to use the red Ethernet WAN port, you may observe when using DHCP-client, the WAN port acquires a different IP address every time the hub is power-cycled. This is because the WAN port's MAC address has not been defined properly during boot up. A side effect is if the hub is attached to your LAN, it could use up the pool of DHCP IP addresses if the hub is rebooted very frequently. Fortunately, the WAN port's MAC address does not change during DHCP IP address renewal.

OpenWrt - up to 19.07

To resolve the issue, start LUCI and navigate to `Network -> Interfaces` menu.

Notice the MAC addresses for the LAN and WAN interfaces are very different in above example.

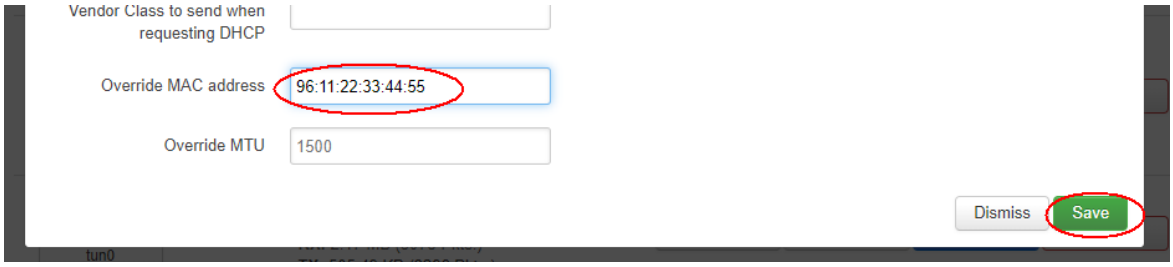
Click on '`Edit`' and go the '`Advanced Settings`' tab.



Scroll down the page until you find the 'Override MAC Address' field.

In the above example, the MAC address beginning '96:6F' changes every time the hub is power cycled.

Enter a new MAC address. Ensure any address you choose is NOT used elsewhere. You can choose to use the MAC address already shown in the above box such as the address beginning '96:6F' if you wish. Ensure the 2nd digit is always an even number, such as '6' in example below.



Press the 'Save' button

Press the 'Save & Apply' button at the bottom of the page.

OpenWrt – all versions

The above method is no longer available starting from OpenWrt 21.02, as part of eventual migration to DSA.

Fortunately, you can also fix the problem by editing the 'wan_dev' section of the /etc/config/network configuration file.

For LEDE 17, search for 'ptm0' as shown below.

For OpenWrt 18, 19 & 21, search for 'dsl0'

For dhcp-client mode

```
config interface 'wan'
      option ifname 'eth0.2'
      option proto 'dhcp'
      option ipv6 'auto'

config device 'wan_dev'
      option name 'ptm0'          # requires to be changed to 'eth0.2'
      option macaddr 'xx:xx:xx:xx:xx:yy'
```

For LEDE 17, OpenWrt 18 and 19, the existing `'wan_dev'` should be amended to read:

```
config device 'wan_dev'
        option name 'eth0.2'
        option macaddr '78:65:59:ae:fc:51'
```

For OpenWrt 21.02, the `option name` should be changed from `dsl0` to `eth0.2`:

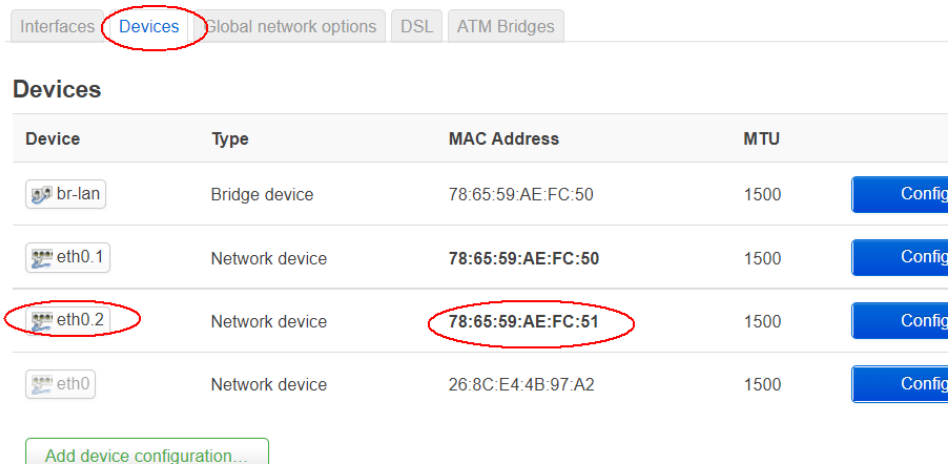
```
config device
        option name 'eth0.2'
        option macaddr '78:65:59:ae:fc:51'
```

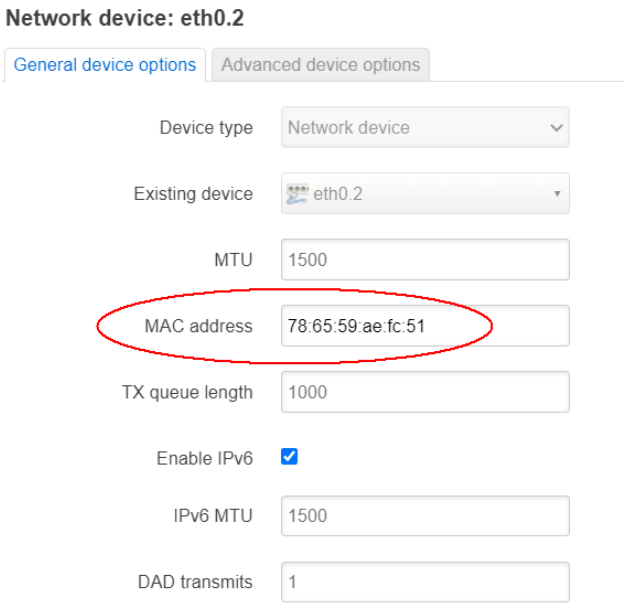
Enter a new MAC address. Ensure any address you choose is NOT in active use elsewhere.

Important: Ensure the 2nd digit is always an even number, such as '8' in above example images.

Note that if you choose to edit the '`option name`' to match what is shown in the `'wan'` section, the `'Override MAC address'` option in LuCI will no longer work in versions of OpenWrt up to 19.07.

For OpenWrt 21.02, navigate to **LuCI -> Network -> Interfaces -> Devices** tab. You can make further changes by clicking on 'Configure' button in future.



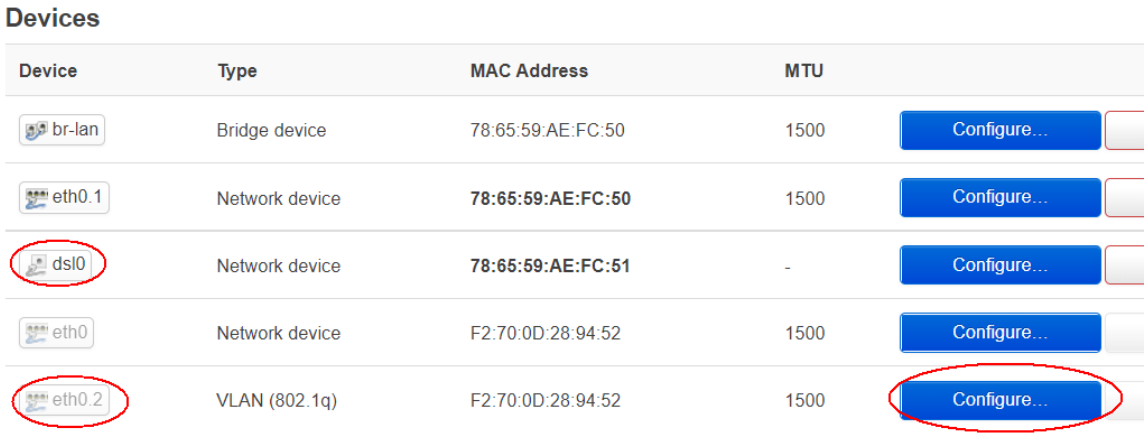


OpenWrt - 21.02 only

If you don't wish to use SSH and VI, this alternative method also appears to work but may leave your **/etc/config/network** file looking a bit more complicated

Navigate to **LuCI -> Network -> Interfaces -> Devices** tab

Locate the `'eth0.2'` entry and click **Configure** button.

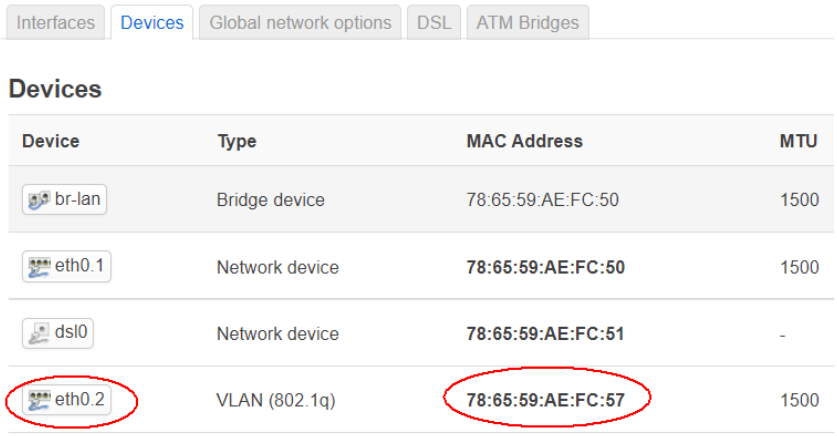


Edit the `MAC address` field as shown below:

Ensure any address you choose is NOT in active use elsewhere.

Important: Ensure the 2nd digit is always an even number, such as '`8`' in the following example image.

Press the '`Save`' button.



Press the `'Save & Apply'` button.

Now reboot the HH5a for the changes to take effect.

The /etc/config/network file will contain a new section:

```
config device
        option name 'eth0.2'
        option type '8021q'
        option ifname 'eth0'
        option vid '2'
        option macaddr '78:65:59:AE:FC:57'
```