Programming the GL.iNet Mini Router for 44Net VPN use

This document covers the following devices

GL.iNet Mini Wireless Router GL-MT300N V2 “Mango”
GL.iNet Mini Smart Router GL-AR300M “Shadow” and variants
GL.iNet Beryl AX (GL-MT3000) and variants
GL.iNet Puli 4G LTE IOT Gateway/Router and variants
GL.iNet Brume 2 travel router

Mark Phillips, NI2O 20220406 V1.7

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Version control

Author	Notes	Date
Mark Phillips, NI2O	Initial Creation	04/06/2022
Mark Phillips NI2O	Updated to newer models	05/19/2024
Mark Phillips, NI2O	Changed test PING IP address	07/22/2024
MArk Phillips, NI2O	Added more supported models	01/11/2025

1 Assumptions

The device is not configured and is in a factory default state.

2 Power up and connect the Mini Router

Connect the Mini Router to a stable USB power supply. The power supply must be capable of delivering at least 2 amps. Failure to deliver proper power will result in random reboots and dropped data packets. Follow the device user guide for more details.

Connect the WAN port to your local network. Connect a regular CAT5/CAT5E/CAT6 cable between the LAN port of the Mini Router and any LAN port of your Internet router. A cable was supplied with your Mini Router.

3 Log in to the Mini Router

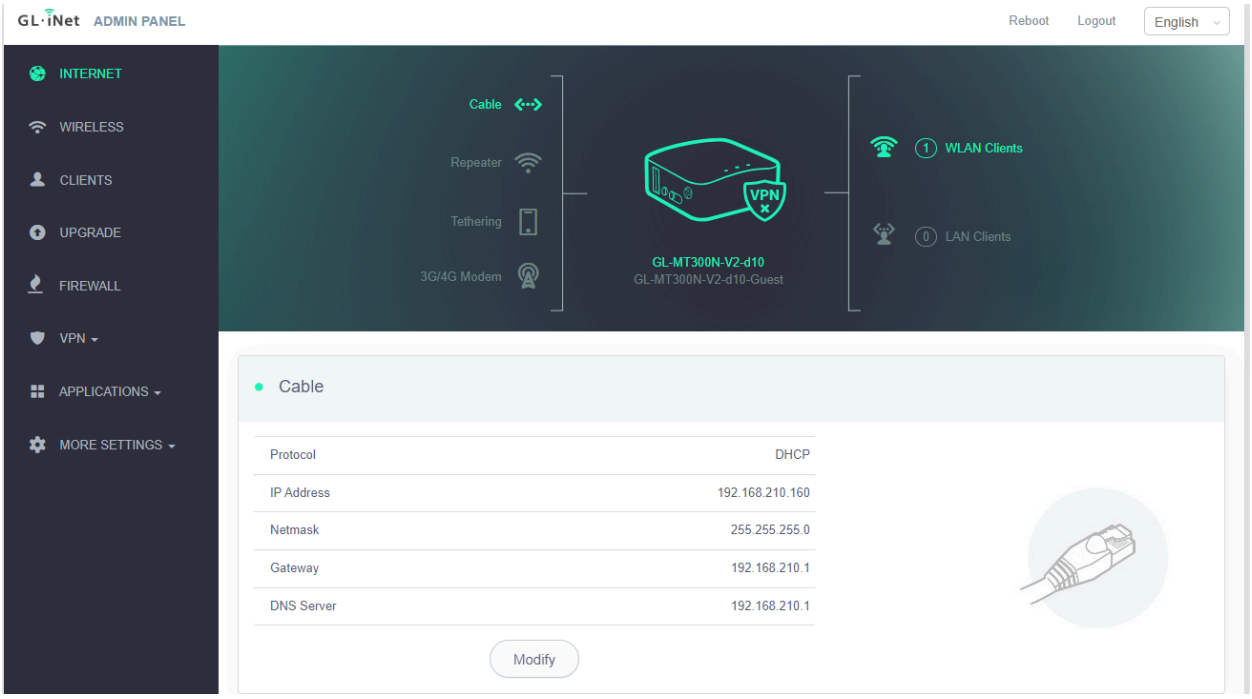
Log into the Mini Router by pointing your browser to http://192.168.8.1

4 Create a new password

This will become the permanent password required to access the web gui interface of the Mini Router

5 Confirm “WAN” connection

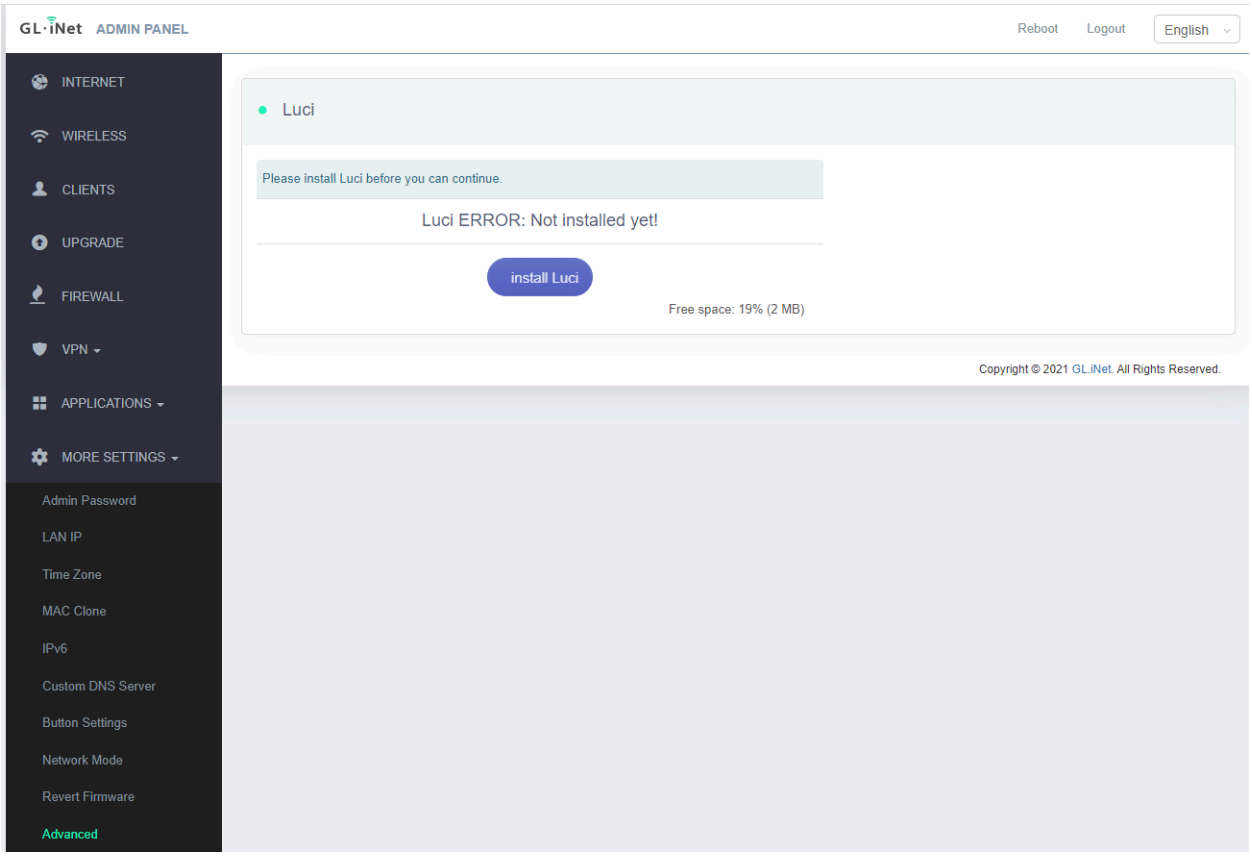
Confirm WAN port is connected by clicking the INTERNET button on the left menu



Make sure that the Mini Router has obtained an IP address from the network it is connected to. A static IP address can be installed by clicking the Modify button and populating the relevant fields accordingly (not covered in this document).

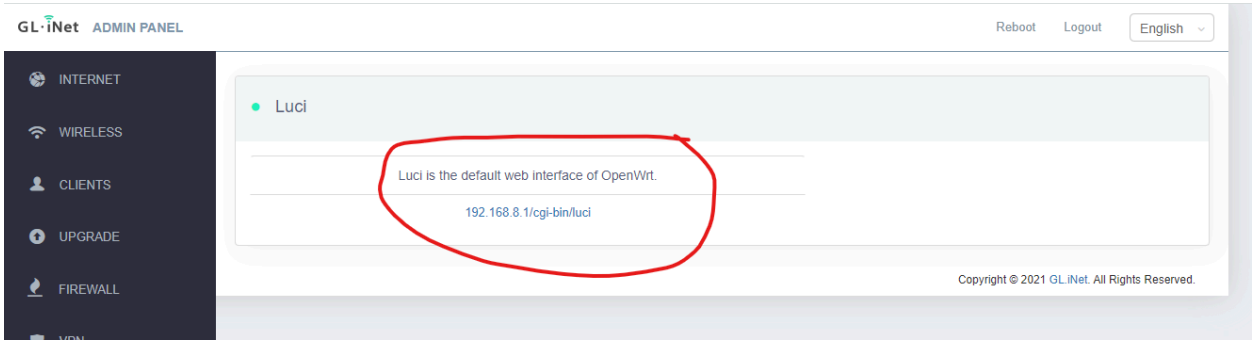
6 Install the Luci advanced config GUI

On the left menu click on MORE SETTINGS > Advanced



Click on the blue “install Luci” button.

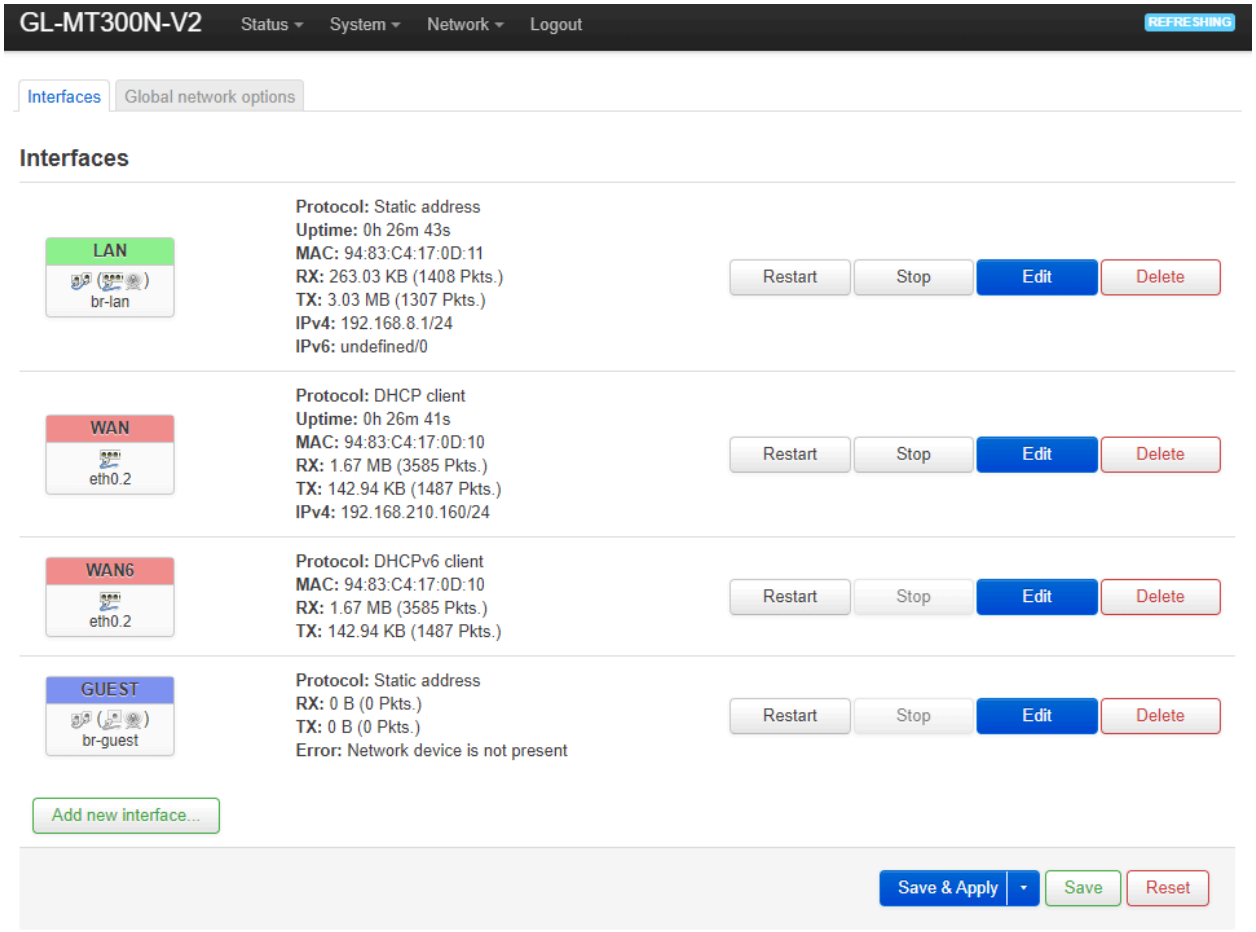
When the install is complete the button will be replaced by a link. Click the link



Log in using the new password you created above.

7 Configure 44net IP settings

From the top black menu select Network > Interfaces

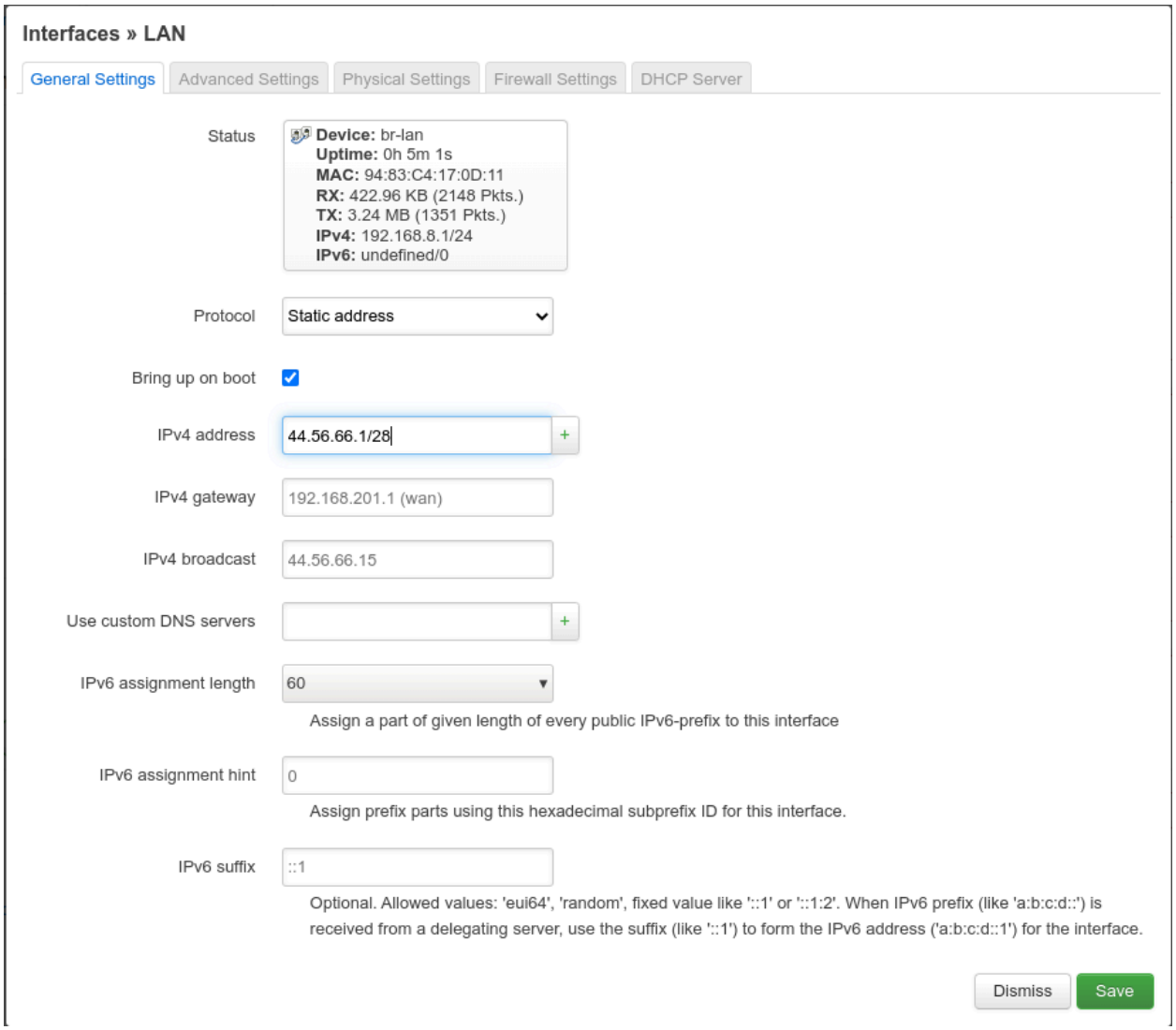


Select the top blue Edit button to edit the LAN information.

Change the IP address settings to those you were given for 44net by your local sysop then click save. Note that there is no field to enter the netmask information. You will therefore have to enter the IP address in proper CIDR notation e.g 44.1.2.3/28. If you are in any doubt please consult your allocation notice from your local sysop as in the below example.

44net IP subnet details for NI2O …..

IP range 44.56.66.0/28
Netmask 255.255.255.240
Gateway 44.56.66.1
Broadcast 44.56.66.15
Usable IP's 13 (not including the gateway)



This next part must be completed within 90 seconds. Please read and re-read these steps before continuing. If you fail to re-connect to the Mini Router power cycle it and start from the beginning.

Press the “Save & Apply” button
Unplug the network cable from your computer
Count to 15
Plug the cable back in again
Open another tab in your browser and type in the ip address of the router you set above
With luck you should be presented with the router's login prompt again. Hit the reload button until you get the prompt.
Log in to the router using the password you set earlier

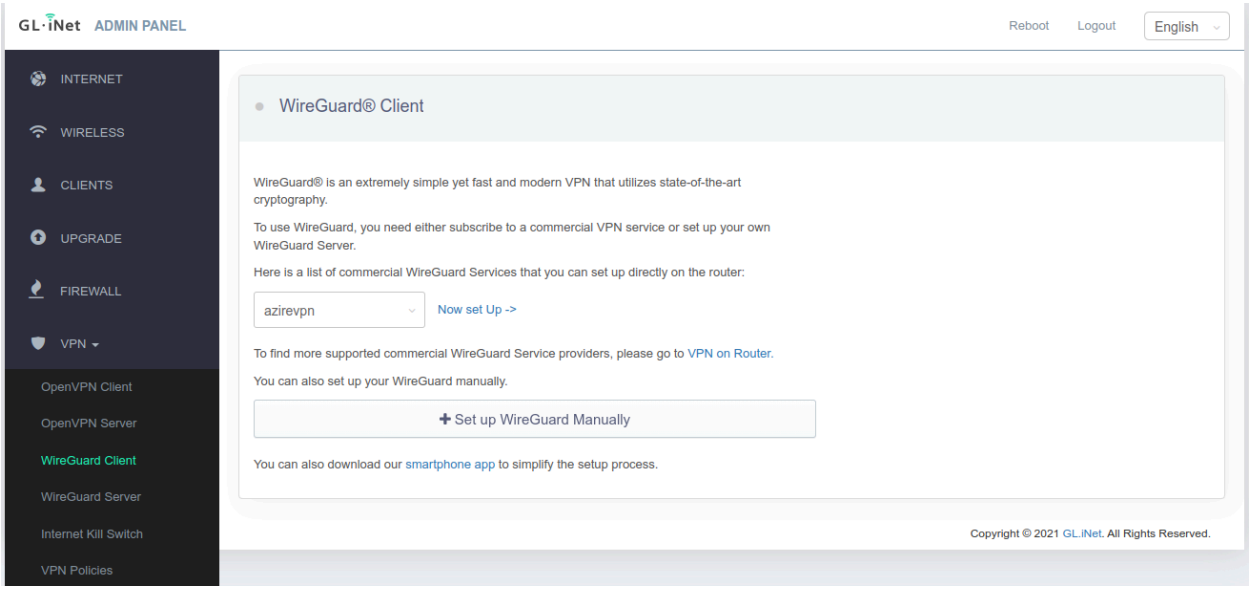
When successfully logged in, close the previous browser page.

8 VPN configuration

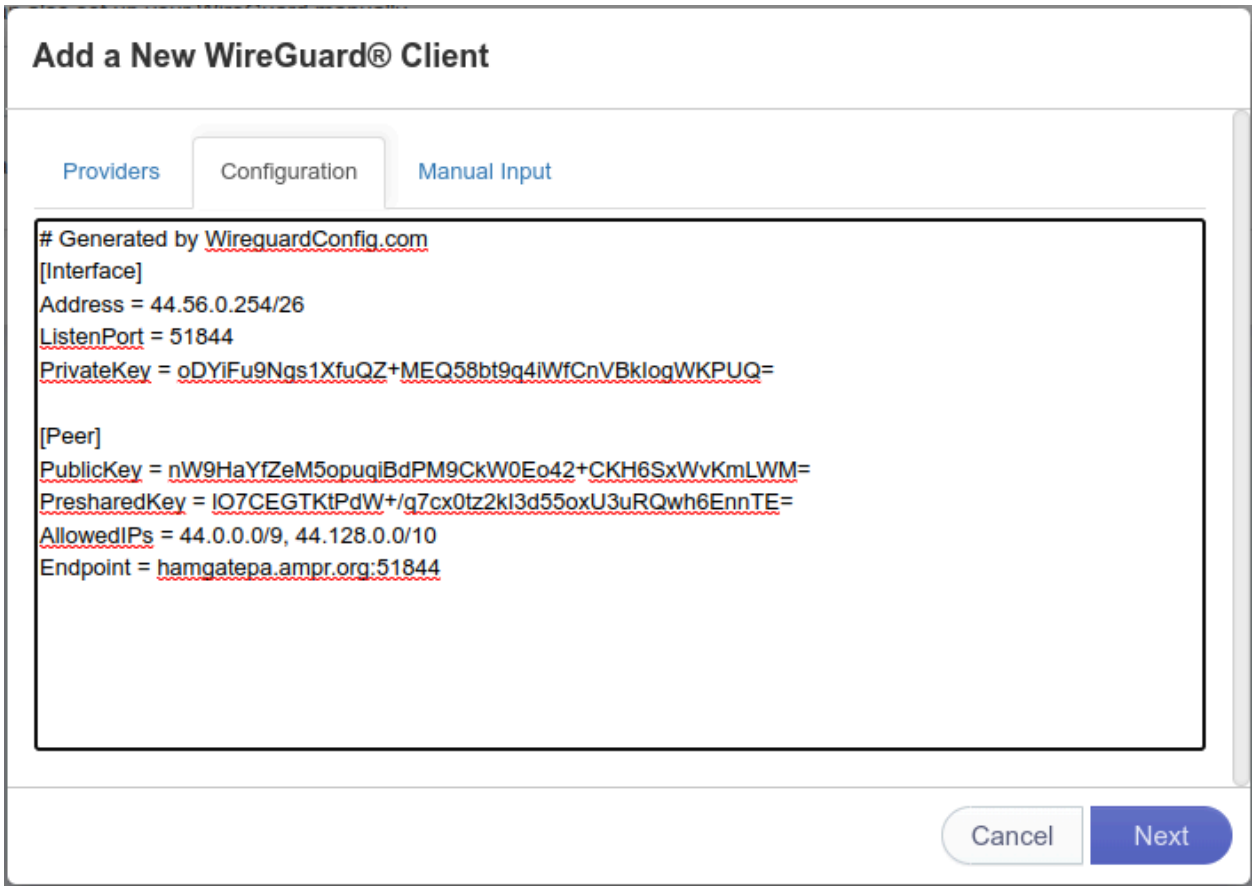
Close the browser page that is pointing to the “Advanced” settings and open a new page pointing to the Mini Router’s new IP address.

From the left menu, select VPN > WireGuard Client

Select “Set up WireGuard Manually” from the right hand side

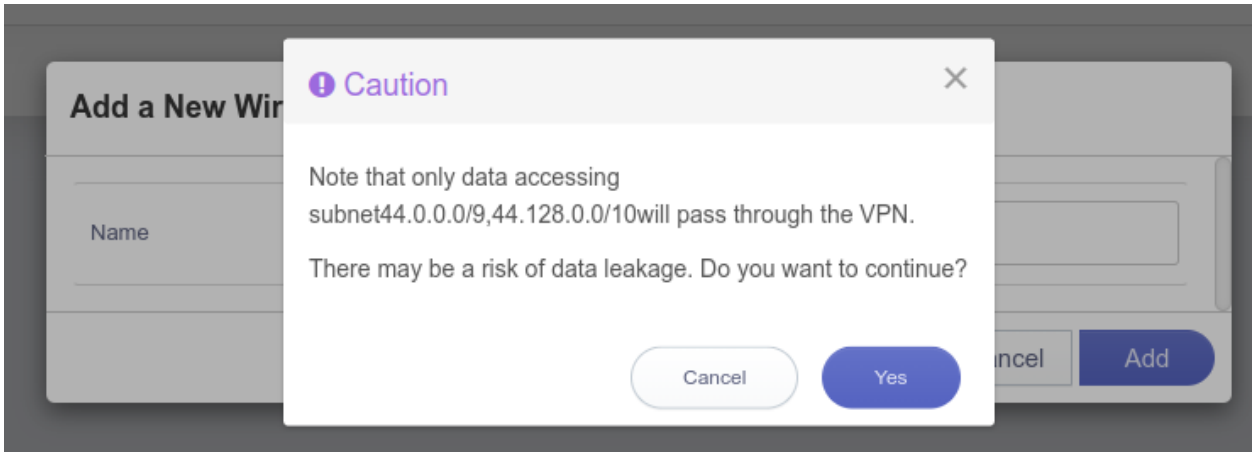


Select the configuration tab and paste the VPN config file you were given by your local sysop into the box as below (note, for security reasons the config in the example will not work). Click Next



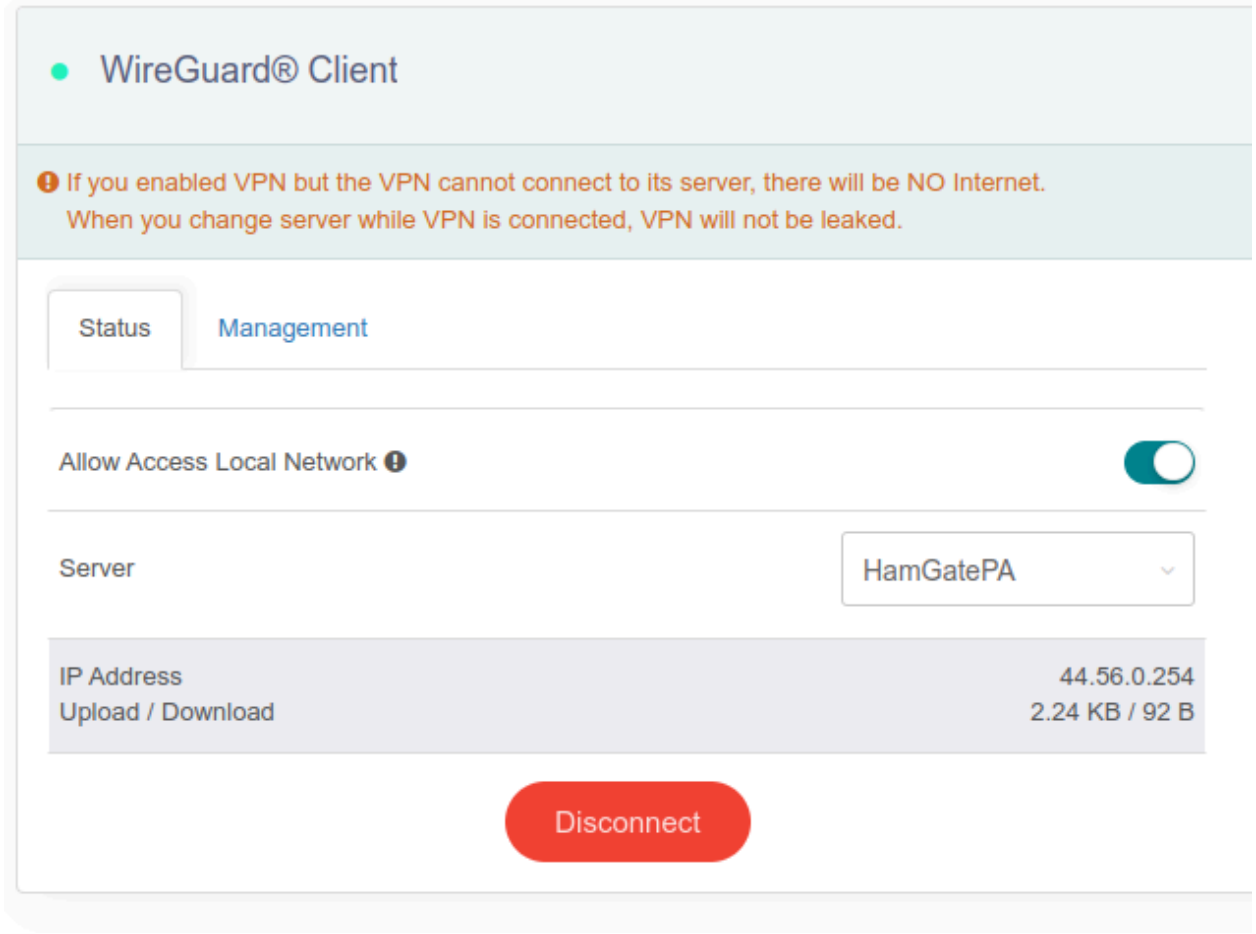
Give the new configuration a name and then click Add

You will get a warning that only the 44 network will be accessible through this connection. Click Yes. We are NOT your Internet provider. Only access to the 44net ham radio network is provided via this link.



At this point we need to make a decision. The point of having your own IP subnet is to allow the outside world to connect to your devices. If you want this to happen click the slider labeled “Allow Access Local Network”.

To turn the VPN on click the connect button. Within a few seconds you should see an IP address (not the same one you configured earlier) and some upload/download data. If the VPN fails to establish a connection an error will appear.

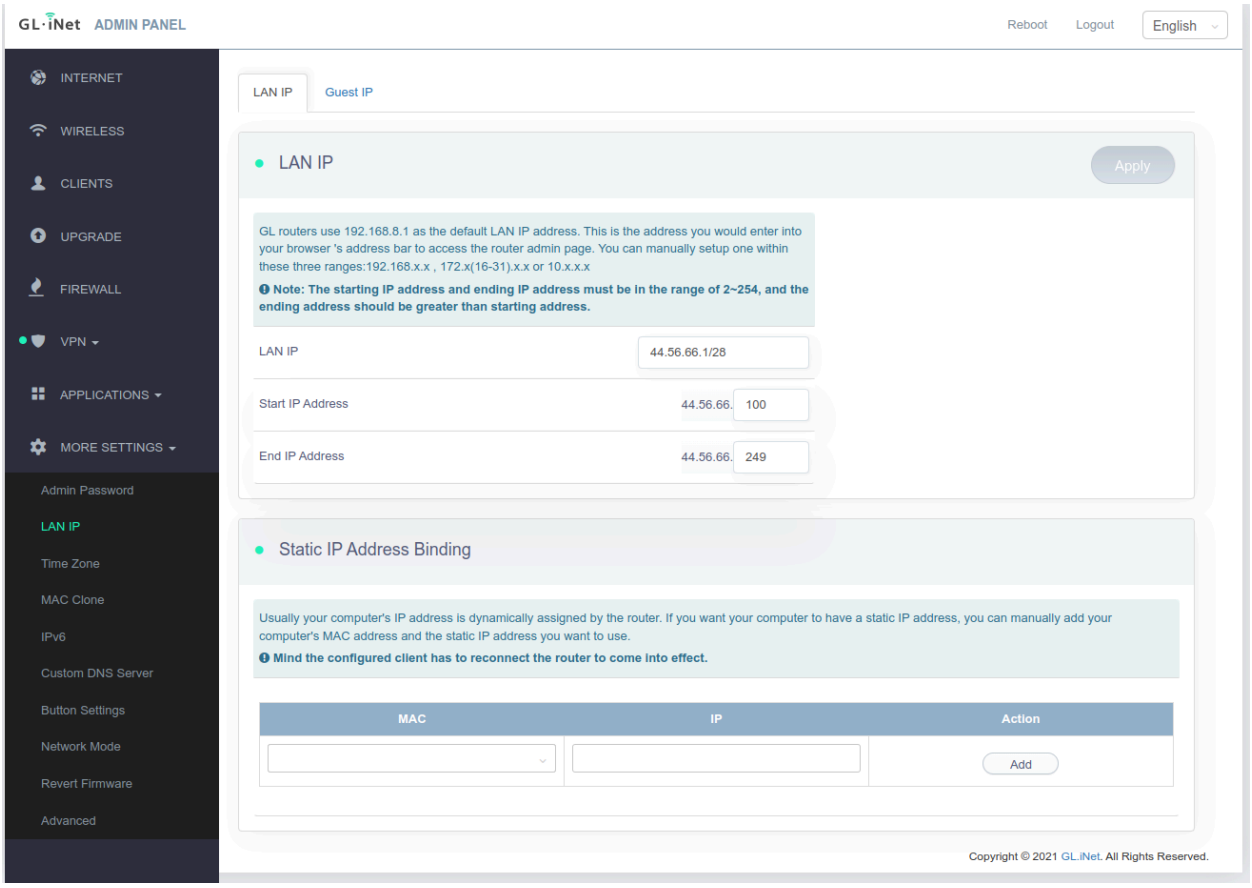


9 Correct DHCP settings

Your Mini Router needs to know the correct range of IP addresses to hand out to requesting devices on its LAN interface.

Your local sysop should have told you what usable addresses are available in your subnet. A discussion of subnets and how to establish usable addresses is beyond the scope of this document.

From the left menu click More Settings > LAN IP and then populate the fields on the right accordingly. You may also issue a particular IP address to a specific device by populating the device MAC address details in the table at the bottom of the page. This is required in some cases where services are made available to the outside world (such as a chat server) to avoid the IP address of the device changing after the DHCP timer has expired.



At this point any device connected to the Mini Router's LAN interface will be issued an IP address according to the subnet issued to you by your local sysop. If you connect more devices that you have IP addresses the later devices will fail to collect an address. If you need more addresses please make your case to your local sysop for a larger subnet.

10 Connection test

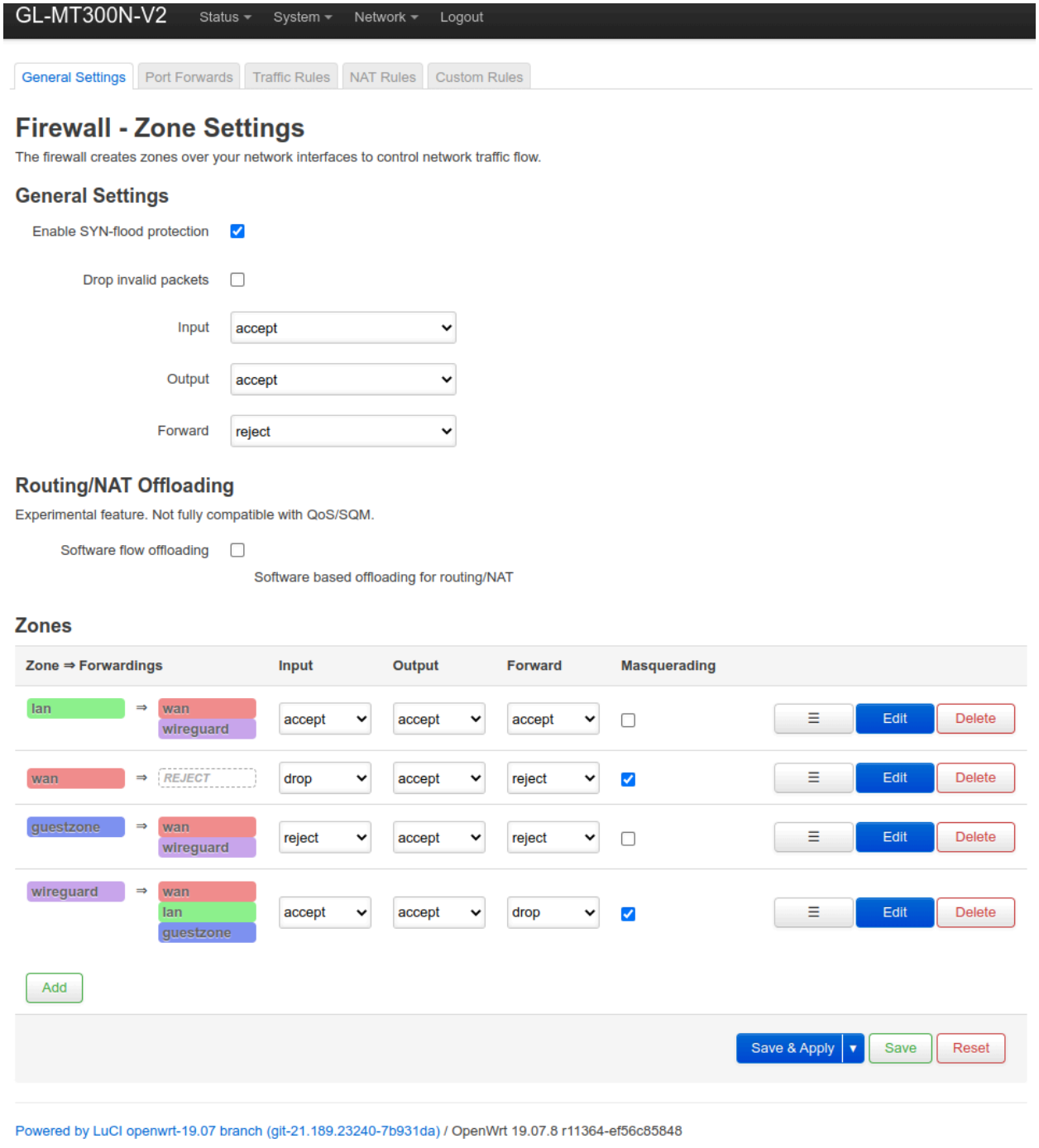
To test connectivity from your devices, issue a PING to 44.1.1.17 (portal.ampr.org). If this is successful, also do a traceroute or MTR to the same address. Your traceroute should reveal at least one other 44net device that your route passes along before arriving at the destination IP address. If you see only public (non 44.x.x.x) addresses in the path then you arr NOT connected to the VPN.

```
root@AMPRVPN:~# traceroute 44.1.1.17
traceroute to 44.1.1.17 (44.1.1.17), 30 hops max, 60 byte packets
1  vpnhost.hamgatepa.ampr.org (44.56.0.192)  13.186 ms  13.131 ms  13.119 ms
2  * * *
3  169.228.34.82 (169.228.34.82)  80.406 ms  80.788 ms  81.213 ms
4  nodem-core-6807-vlan2995-gw.ucsd.edu (132.239.255.49)  80.292 ms  80.287 ms
5  mx0-vlan2761-gw.ucsd.edu (132.239.254.162)  88.606 ms  80.236 ms  80.226 ms
Etc ….
```

11 Overcoming Masquerade/NAT

By default your Mini Router will masquerade or “NAT” all outgoing VPN traffic to present the inclusion that the traffic originates from the Mini Router itself. This is a common firewall practice that protects devices behind the firewall from incoming attacks. If however you require incoming access to your other machines served by the Mini Router you will need to disable this NAT feature.

Navigate your browser to the Advanced setting page of the Mini Router.Then from the top black menu select Network > Firewall.



Change the settings for the Wireguard zone to accept Forwarding and uncheck the Masquerade setting. Finally, select “Save & Apply”.

12 Force a reboot

Force the Mini Router to reboot by selecting the “Reboot” button at the top right of the screen. This will check that your router retains the configuration we have just created.

13 Configure WiFi and other router services

Your Mini Router has WiFi abilities as well as File Sharing and a few other things. These are optional steps and not covered in this document.