

APPLICATION NOTE

APNUS018 GRE TUNNEL OVER Wi-Fi *Configuration example*

May 2020 – Rev. A1

Introduction

This application note is intended to help you configure your WaveOS Acksys products for the creation of a GRE tunnel between the AP and the Client. We consider that the Wi-Fi interfaces of the products have been previously configured and that the wireless link is working. If you need assistance with this part, please consult the application note *APNUS003 A simple wireless link*

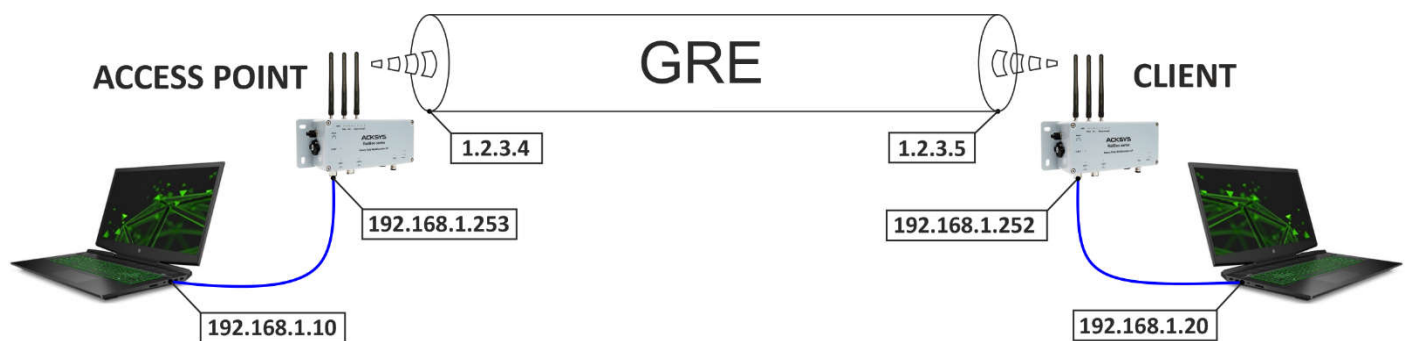
Devices configuration

For this example, we will use the following parameters:

- Access Point Ethernet IP address = 192.168.1.253/24
- Access Point local GRE IP address = 1.2.3.4/24
- Client Ethernet IP address = 192.168.1.252/24
- Client local GRE IP address = 1.2.3.5/24

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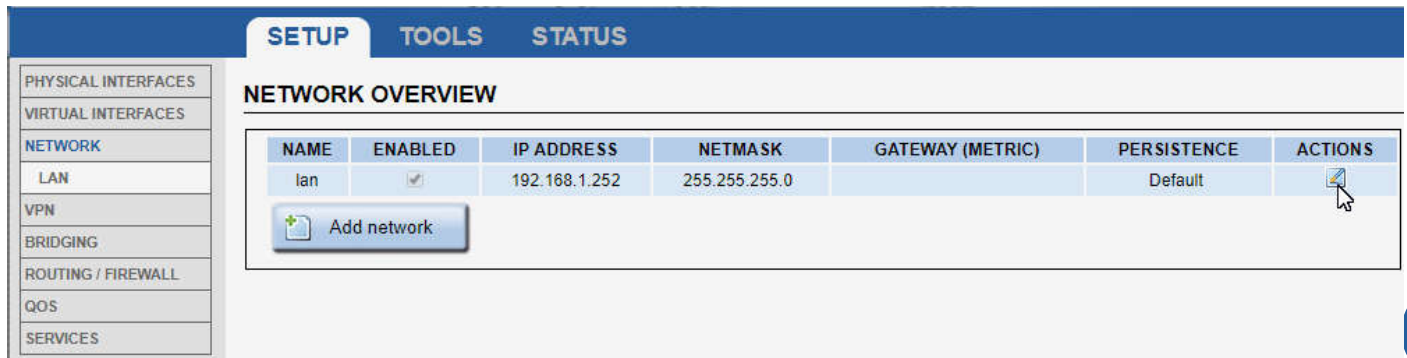
The products used for this example are Railbox/11A0, which have two radio cards. We will only use WiFi 1 radio of each unit, radio WiFi 2 is disabled.



We will configure the two products from a PC connected behind the Access Point, so we must start by configuring the remote client.

Client configuration

Open the LAN configuration page:

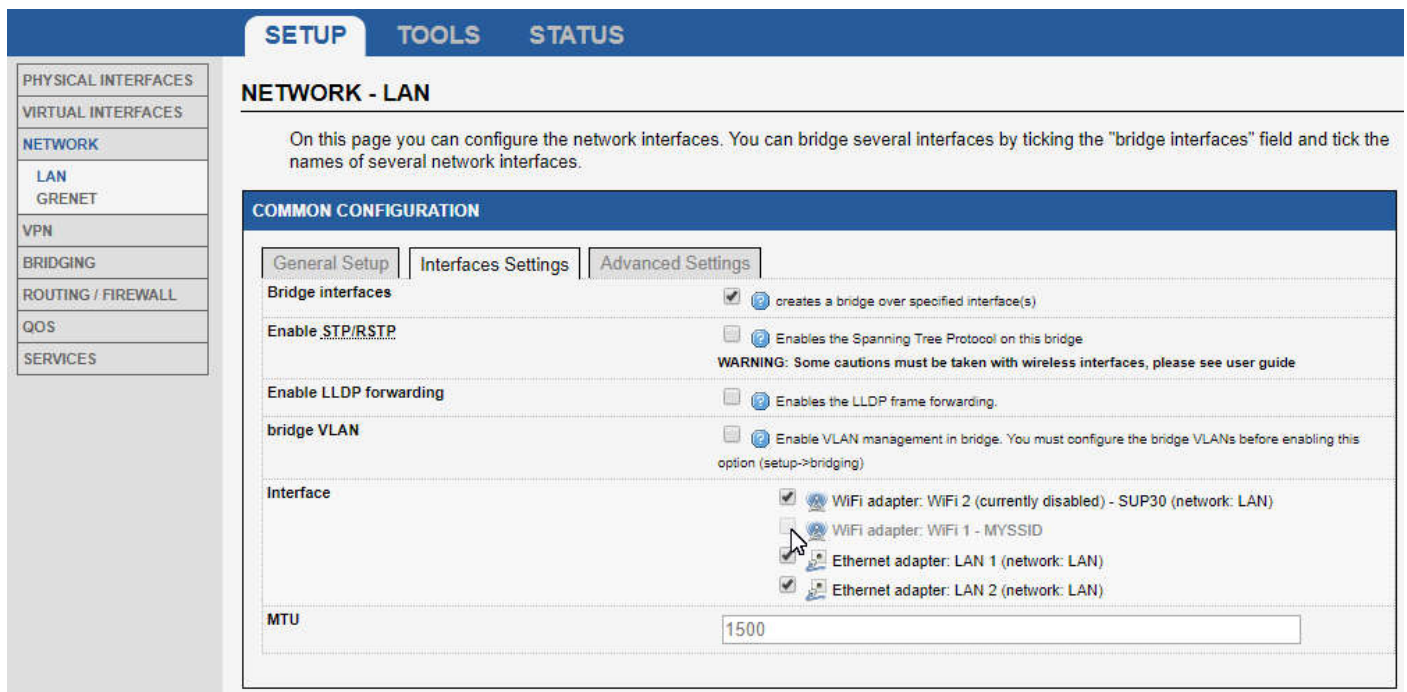


NETWORK OVERVIEW

NAME	ENABLED	IP ADDRESS	NETMASK	GATEWAY (METRIC)	PERSISTENCE	ACTIONS
lan	☒	192.168.1.252	255.255.255.0		Default	

Add network

In the *Interfaces Settings* tab, remove the WiFi 1 interface from the bridge:



NETWORK - LAN

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and tick the names of several network interfaces.

COMMON CONFIGURATION

General Setup | **Interfaces Settings** | **Advanced Settings**

Bridge interfaces ☒ creates a bridge over specified interface(s)

Enable STP/RSTP ☐ Enables the Spanning Tree Protocol on this bridge
WARNING: Some cautions must be taken with wireless interfaces, please see user guide

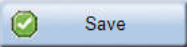
Enable LLDP forwarding ☐ Enables the LLDP frame forwarding.

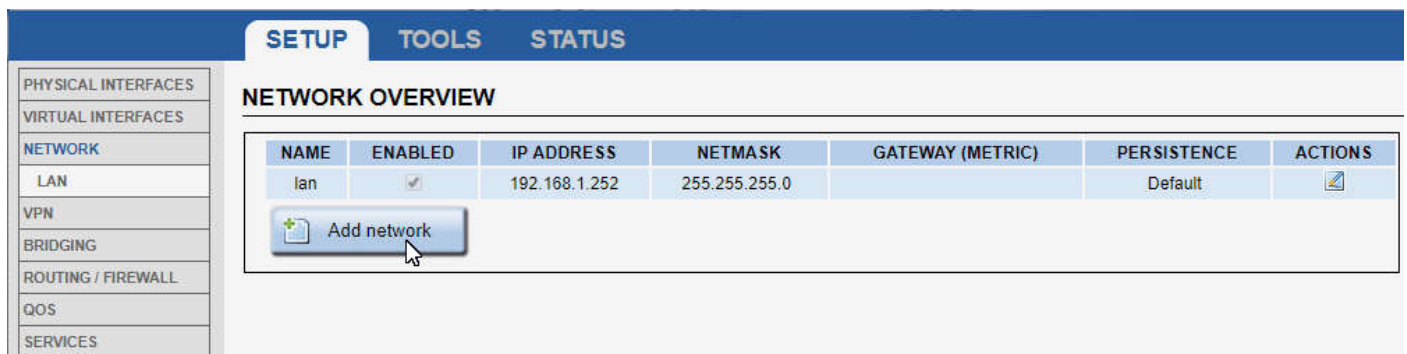
bridge VLAN ☐ Enable VLAN management in bridge. You must configure the bridge VLANs before enabling this option (setup->bridging)

Interface

- ☒ WiFi adapter: WiFi 2 (currently disabled) - SUP30 (network: LAN)
- ☐ WiFi adapter: WiFi 1 - MYSSID
- ☒ Ethernet adapter: LAN 1 (network: LAN)
- ☒ Ethernet adapter: LAN 2 (network: LAN)

MTU 1500

Save  and click **NETWORK** in the left column to return to the **NETWORK OVERVIEW** page, then click **Add Network**:

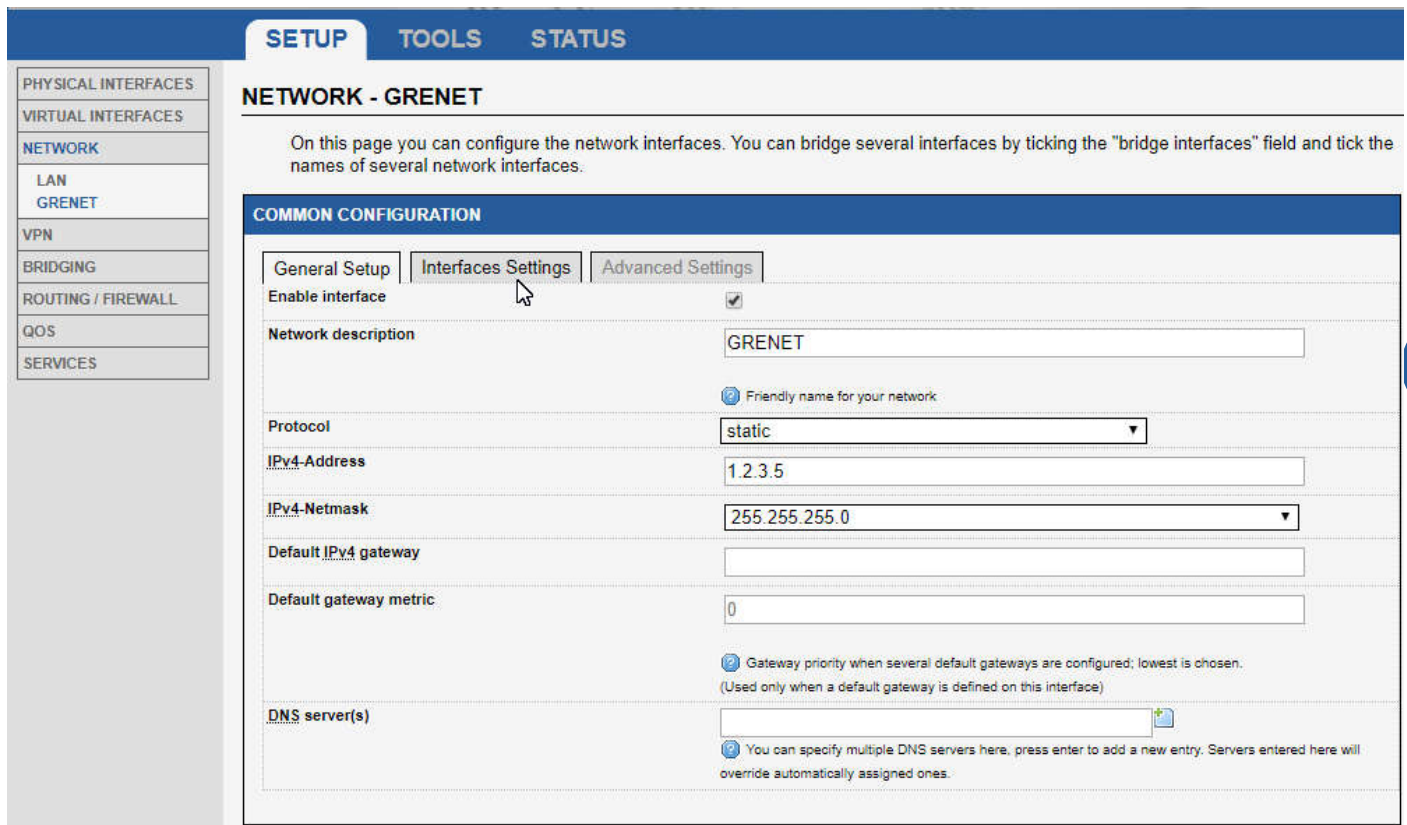


NETWORK OVERVIEW

NAME	ENABLED	IP ADDRESS	NETMASK	GATEWAY (METRIC)	PERSISTENCE	ACTIONS
lan	☒	192.168.1.252	255.255.255.0		Default	

Add network

This new network will be bound to the local endpoint of our GRE tunnel. In this page, we set the name, **GRENET** and the local address of our tunnel: **1.2.3.5**, and then click on *Interfaces Settings*



SETUP **TOOLS** **STATUS**

PHYSICAL INTERFACES
VIRTUAL INTERFACES
NETWORK
LAN
GRENET
VPN
BRIDGING
ROUTING / FIREWALL
QOS
SERVICES

NETWORK - GRENET

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and tick the names of several network interfaces.

COMMON CONFIGURATION

General Setup **Interfases Settings** Advanced Settings

Enable interface ☒

Network description GRENET

Friendly name for your network

Protocol static

IPv4 Address 1.2.3.5

IPv4 Netmask 255.255.255.0

Default IPv4 gateway

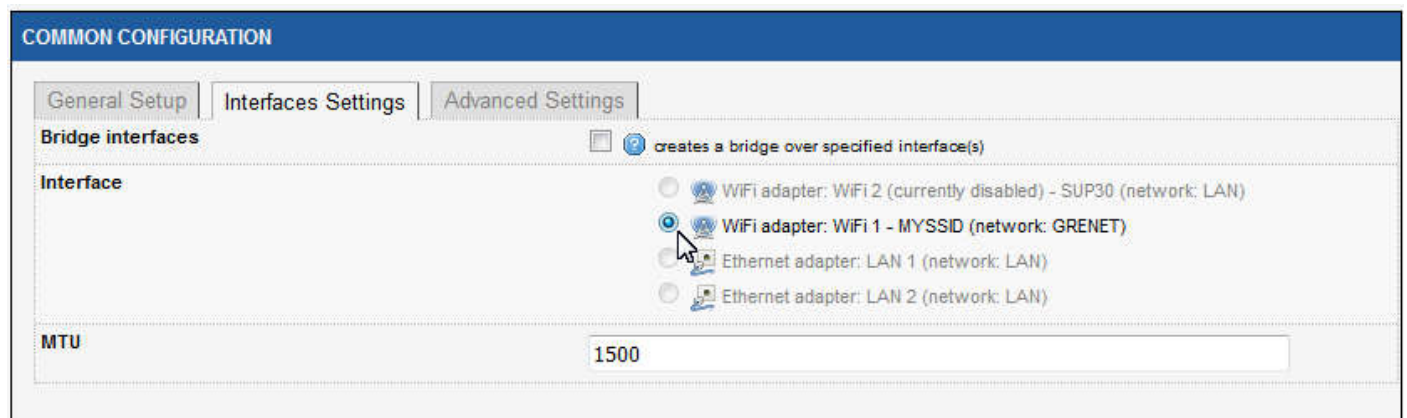
Default gateway metric 0

Gateway priority when several default gateways are configured; lowest is chosen. (Used only when a default gateway is defined on this interface)

DNS server(s)

You can specify multiple DNS servers here, press enter to add a new entry. Servers entered here will override automatically assigned ones.

In Interfaces Settings, we attach our network to the **WiFi 1** interface.



COMMON CONFIGURATION

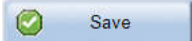
General Setup **Interfases Settings** Advanced Settings

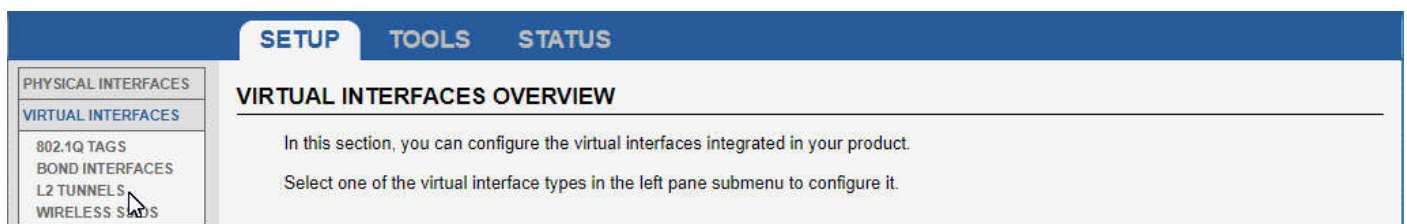
Bridge interfaces ☒ creates a bridge over specified interface(s)

Interface

- ☐ WiFi adapter: WiFi 2 (currently disabled) - SUP30 (network: LAN)
- ☒ WiFi adapter: WiFi 1 - MYSSID (network: GRENET)
- ☐ Ethernet adapter: LAN 1 (network: LAN)
- ☐ Ethernet adapter: LAN 2 (network: LAN)

MTU 1500

Now we save the modifications  and we can go to the **L2 TUNNELS OVERVIEW**



SETUP **TOOLS** **STATUS**

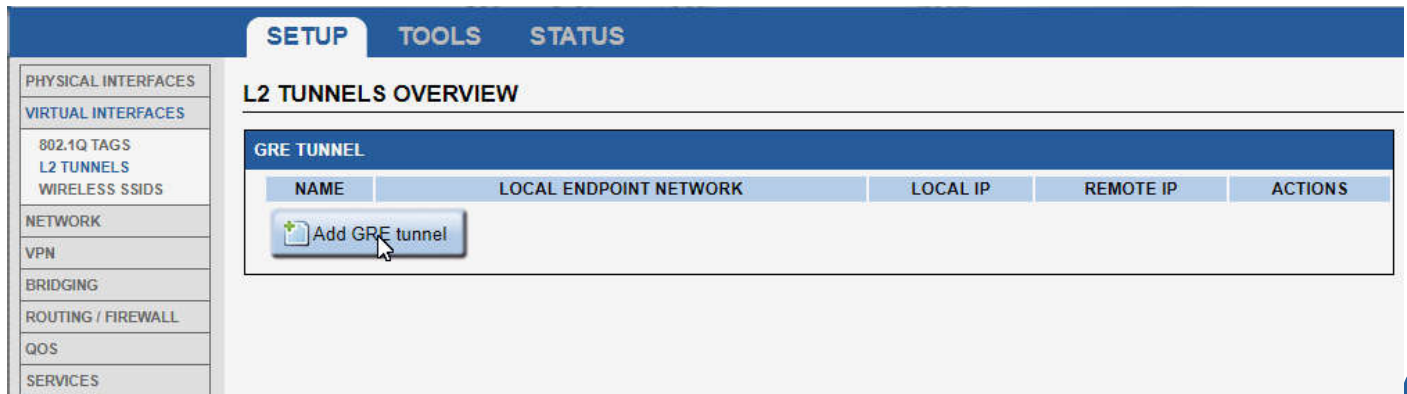
PHYSICAL INTERFACES
VIRTUAL INTERFACES
802.1Q TAGS
BOND INTERFACES
L2 TUNNELS
WIRELESS STAs

VIRTUAL INTERFACES OVERVIEW

In this section, you can configure the virtual interfaces integrated in your product.

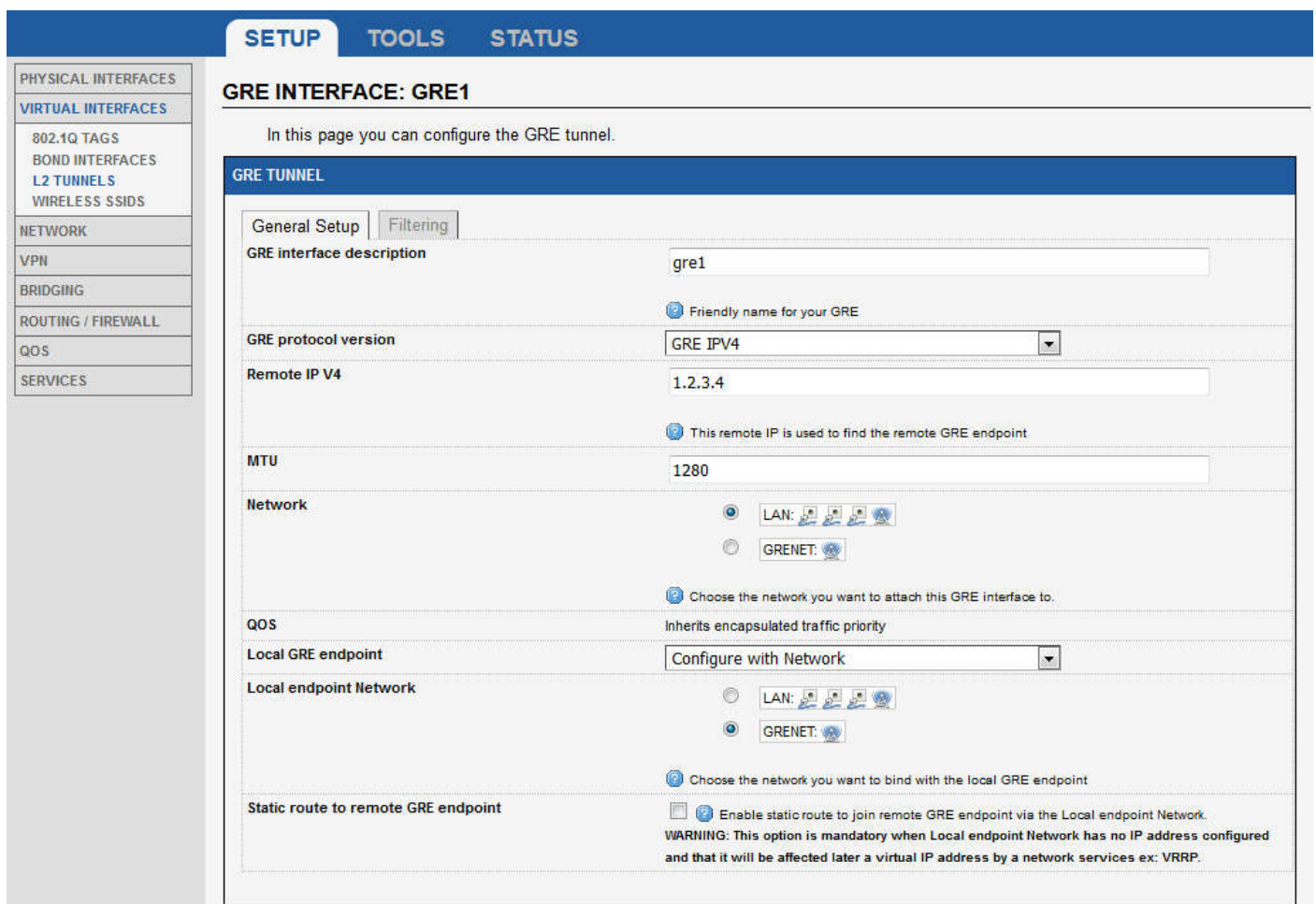
Select one of the virtual interface types in the left pane submenu to configure it.

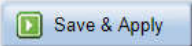
In the L2 TUNNELS OVERVIEW, click Add GRE tunnel to create the tunnel:



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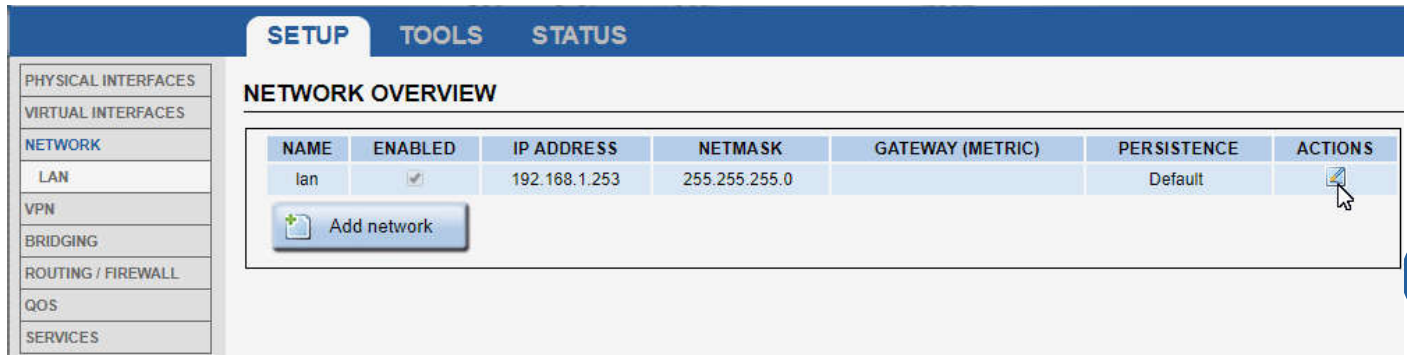
This is where we configure our tunnel. We indicate the address of the remote endpoint, **1.2.3.4**. The Network attached to this endpoint is our **LAN** bridge, and we bind the tunnel to our **GRENET** network



We can now save and apply the changes  The client configuration is complete

Access Point configuration

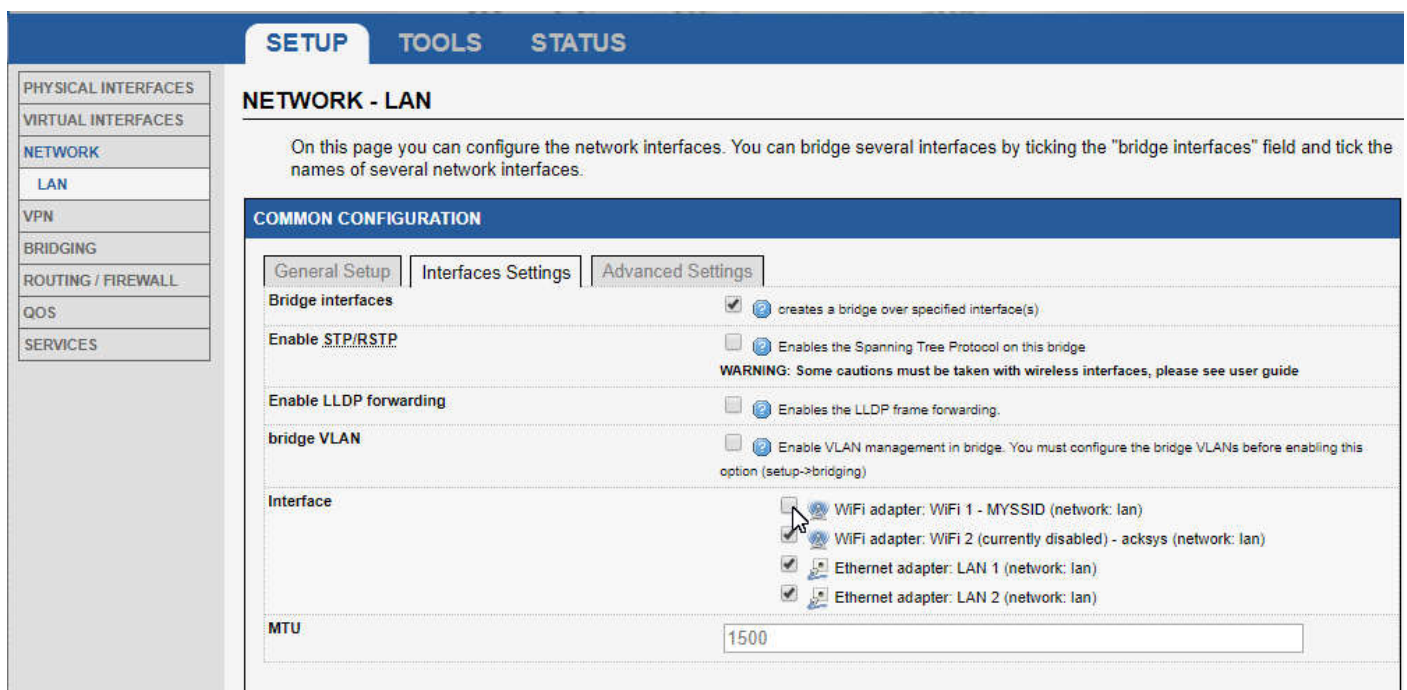
While the Client is restarting with its new settings, we can configure the AP in a completely similar way. We start by detaching the **WiFi 1** interface from the bridge in the **LAN** Network:



NETWORK OVERVIEW

NAME	ENABLED	IP ADDRESS	NETMASK	GATEWAY (METRIC)	PERSISTENCE	ACTIONS
lan	☒	192.168.1.253	255.255.255.0		Default	

Add network



NETWORK - LAN

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and tick the names of several network interfaces.

COMMON CONFIGURATION

General Setup | Interfaces Settings | Advanced Settings

Bridge interfaces ☒ creates a bridge over specified interface(s)

Enable STP/RSTP ☐ Enables the Spanning Tree Protocol on this bridge
WARNING: Some cautions must be taken with wireless interfaces, please see user guide

Enable LLDP forwarding ☐ Enables the LLDP frame forwarding.

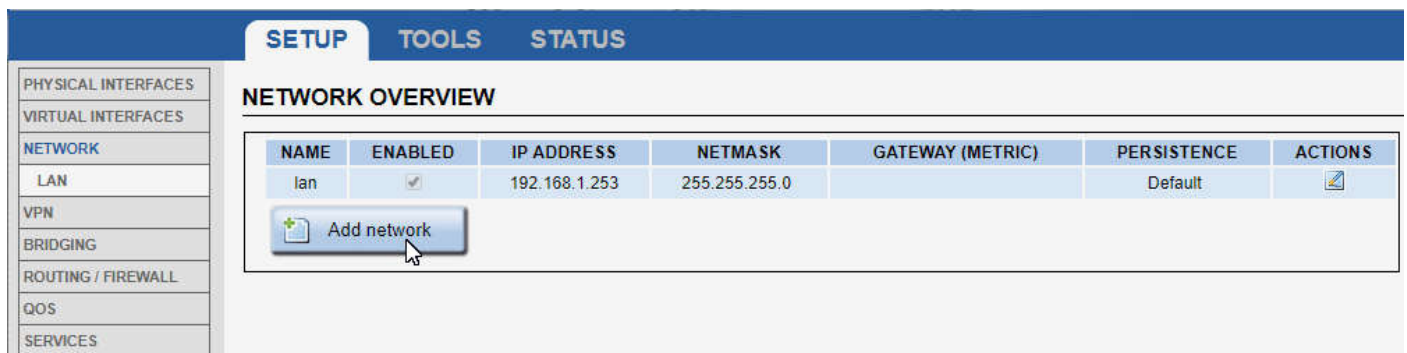
bridge VLAN ☐ Enable VLAN management in bridge. You must configure the bridge VLANs before enabling this option (setup->bridging)

Interface

- ☐ WiFi adapter: WiFi 1 - MYSSID (network: lan)
- ☒ WiFi adapter: WiFi 2 (currently disabled) - acksys (network: lan)
- ☒ Ethernet adapter: LAN 1 (network: lan)
- ☒ Ethernet adapter: LAN 2 (network: lan)

MTU

Save and click **NETWORK** in the left column to return to the **NETWORK OVERVIEW** page, then click **Add Network**:

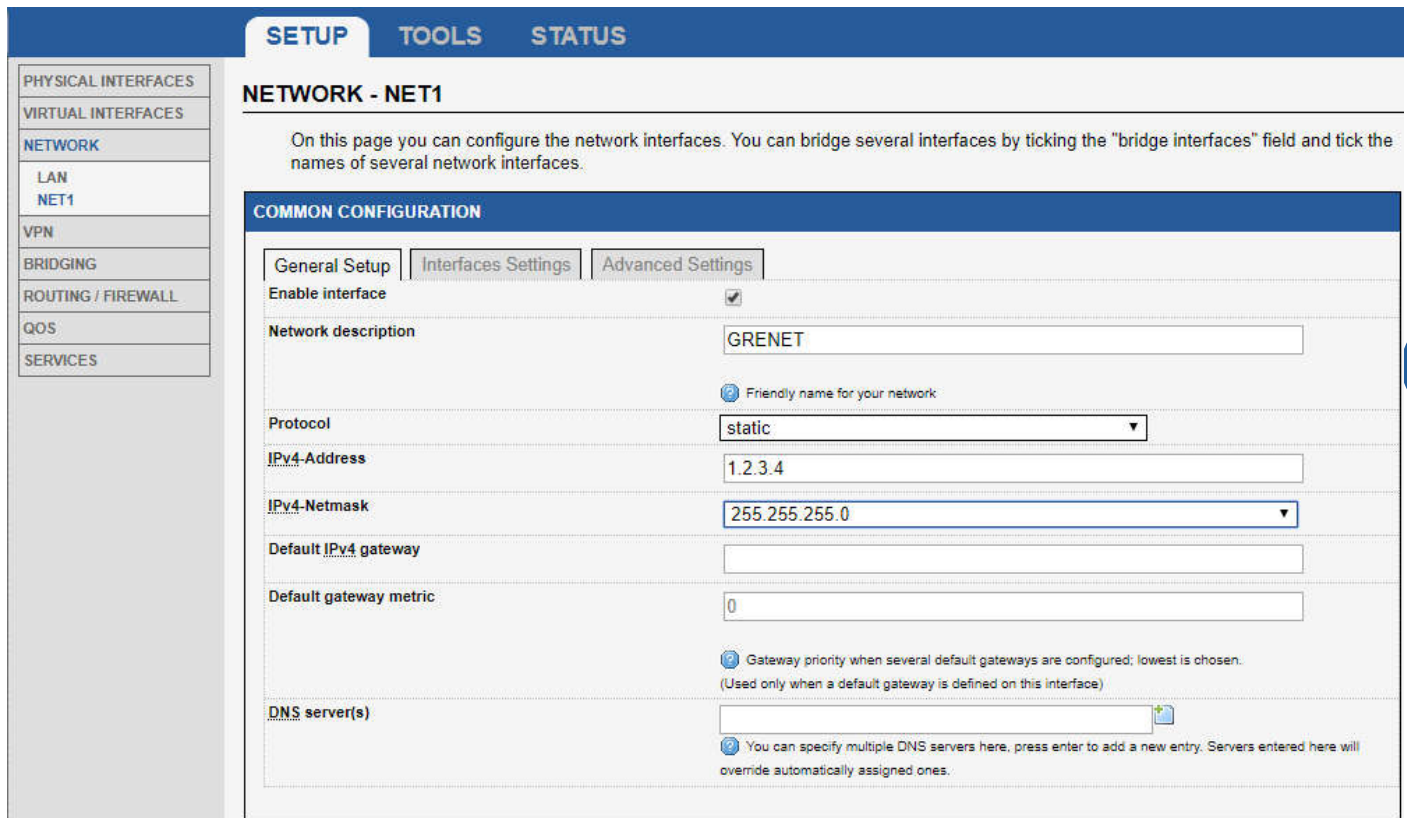


NETWORK OVERVIEW

NAME	ENABLED	IP ADDRESS	NETMASK	GATEWAY (METRIC)	PERSISTENCE	ACTIONS
lan	☒	192.168.1.253	255.255.255.0		Default	

Add network

As for the Client, we create the **GRENET** network and give it the address of the local endpoint of the tunnel, **1.2.3.5**, and then click on *Interfaces Settings*



SETUP **TOOLS** **STATUS**

PHYSICAL INTERFACES
VIRTUAL INTERFACES
NETWORK
LAN
NET1
VPN
BRIDGING
ROUTING / FIREWALL
QOS
SERVICES

NETWORK - NET1

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and tick the names of several network interfaces.

COMMON CONFIGURATION

General Setup **Interfases Settings** **Advanced Settings**

Enable interface ☒

Network description GRENET

Protocol static

IPv4 Address 1.2.3.4

IPv4 Netmask 255.255.255.0

Default IPv4 gateway

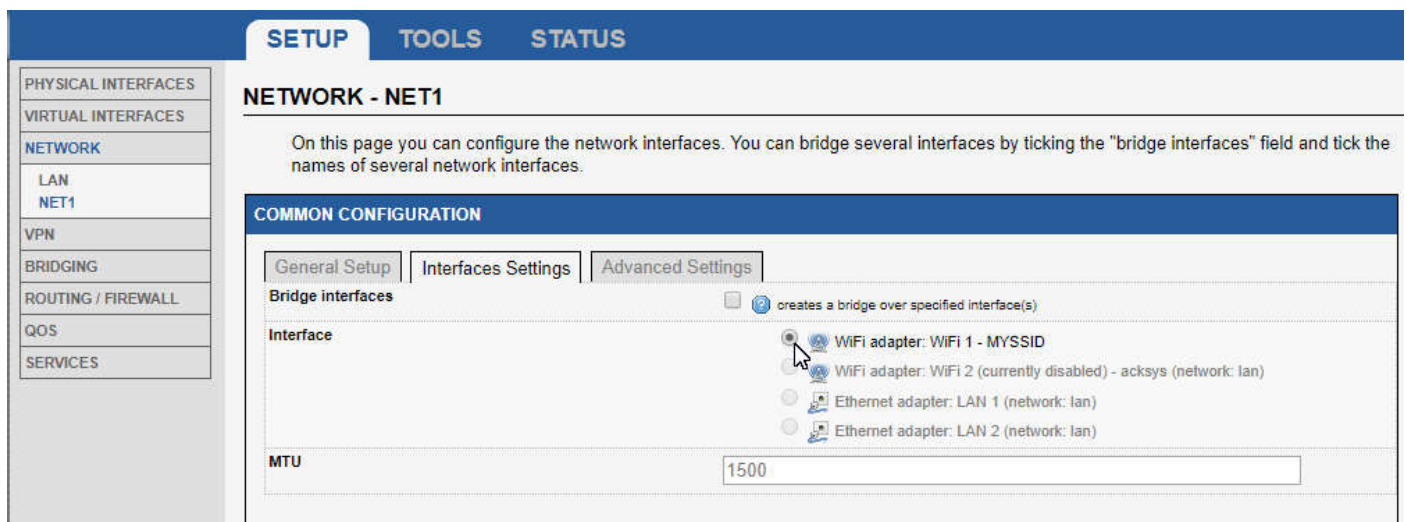
Default gateway metric 0

DNS server(s)

Gateway priority when several default gateways are configured: lowest is chosen.
(Used only when a default gateway is defined on this interface)

You can specify multiple DNS servers here, press enter to add a new entry. Servers entered here will override automatically assigned ones.

In Interfaces Settings, we attach this network to the WiFi 1 interface.



SETUP **TOOLS** **STATUS**

PHYSICAL INTERFACES
VIRTUAL INTERFACES
NETWORK
LAN
NET1
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BRIDGING
ROUTING / FIREWALL
QOS
SERVICES

NETWORK - NET1

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and tick the names of several network interfaces.

COMMON CONFIGURATION

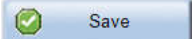
General Setup **Interfases Settings** **Advanced Settings**

Bridge interfaces ☒ creates a bridge over specified interface(s)

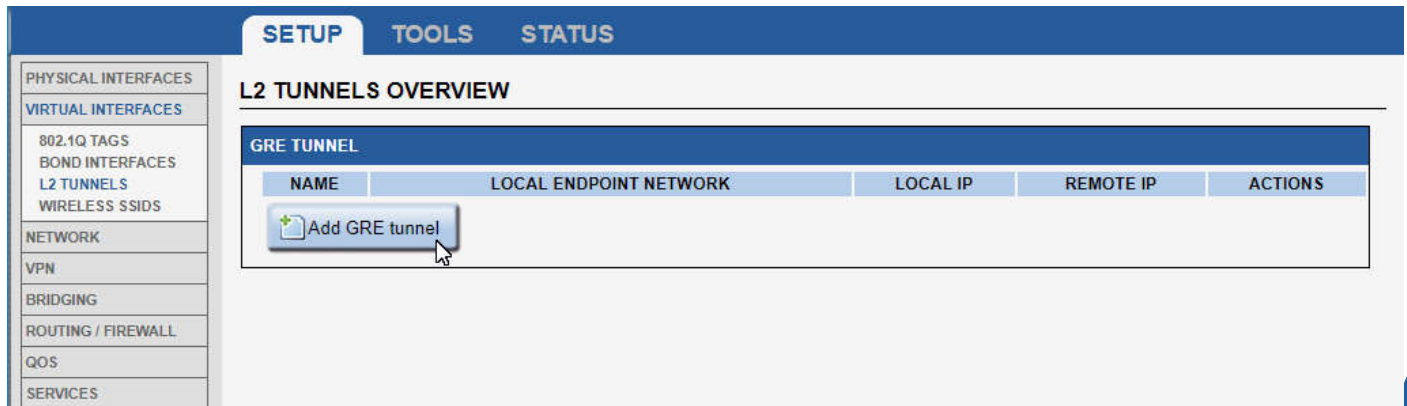
Interface

- ☒ WiFi adapter: WiFi 1 - MYSSID
- ☐ WiFi adapter: WiFi 2 (currently disabled) - acksys (network: lan)
- ☐ Ethernet adapter: LAN 1 (network: lan)
- ☐ Ethernet adapter: LAN 2 (network: lan)

MTU 1500

Now we save the modifications  and continue with the **L2 TUNNELS OVERVIEW**

Click Add GRE tunnel to create the tunnel:



SETUP **TOOLS** **STATUS**

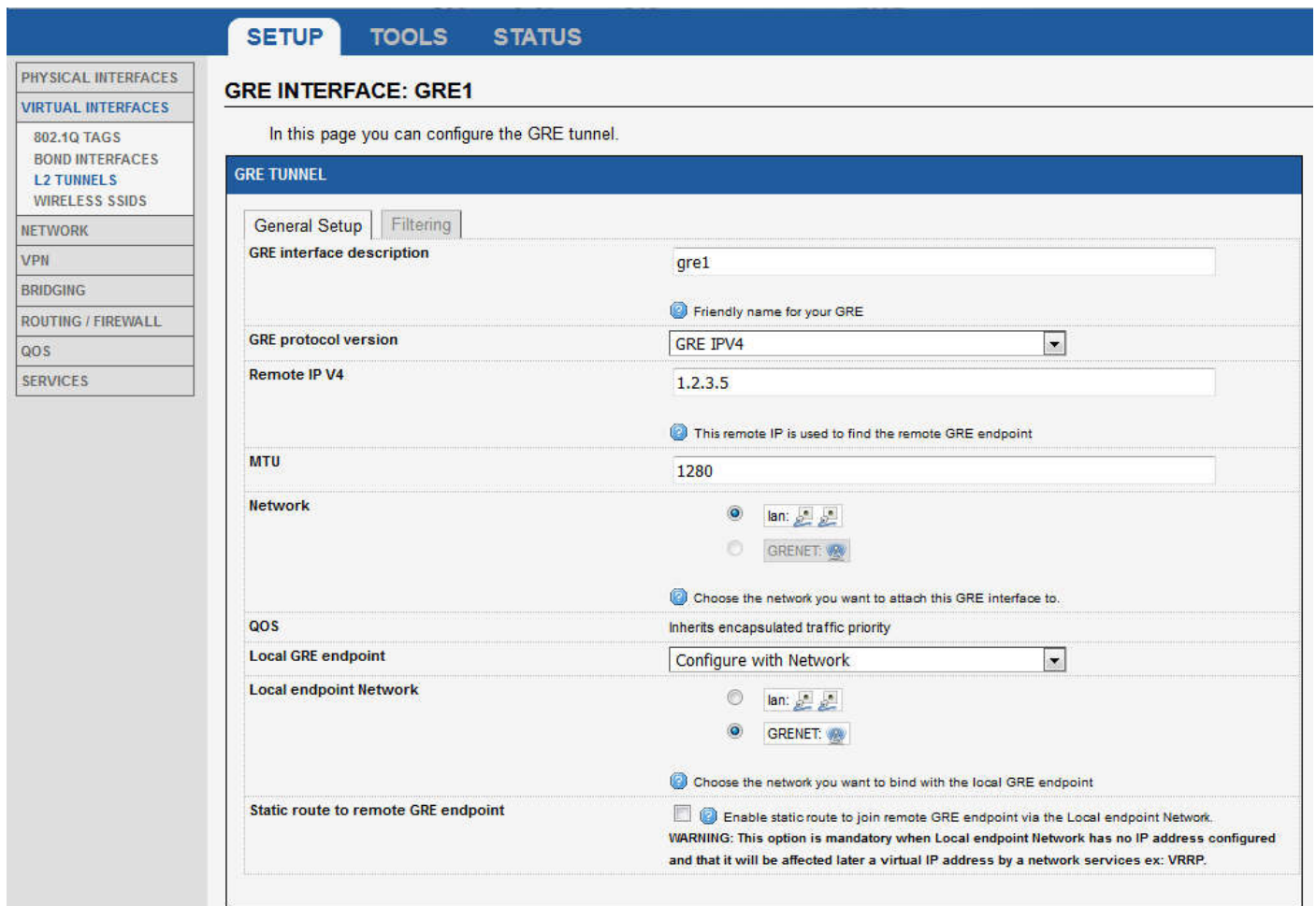
L2 TUNNELS OVERVIEW

GRE TUNNEL

NAME	LOCAL ENDPOINT NETWORK	LOCAL IP	REMOTE IP	ACTIONS
Add GRE tunnel				

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Here, we give the address of the remote endpoint, **1.2.3**. The Network attached to this endpoint is our **LAN** bridge, and we bind the tunnel to our **GRENET** network, just like with the Client.



SETUP **TOOLS** **STATUS**

GRE INTERFACE: GRE1

In this page you can configure the GRE tunnel.

GRE TUNNEL

General Setup Filtering

GRE interface description gre1

Friendly name for your GRE

GRE protocol version GRE IPV4

Remote IP V4 1.2.3.5

This remote IP is used to find the remote GRE endpoint

MTU 1280

Network

lan: GRENET:

Choose the network you want to attach this GRE interface to.

QoS Inherits encapsulated traffic priority

Local GRE endpoint Configure with Network

Local endpoint Network

lan: GRENET:

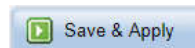
Choose the network you want to bind with the local GRE endpoint

Static route to remote GRE endpoint

Enable static route to join remote GRE endpoint via the Local endpoint Network.

WARNING: This option is mandatory when Local endpoint Network has no IP address configured and that it will be affected later a virtual IP address by a network services ex: VRRP.

The Access Point configuration is complete, we can save and apply



After restarting the Access Point, we can check in the **STATUS/Network** page that the interfaces are correctly mounted

SETUP

TOOLS

STATUS

DEVICE INFO

NETWORK

BRIDGES

MULTICAST ROUTES

ROUTES

WIRELESS

SERVICES

LOGS

INTERFACES

LAN

IP CONFIGURATION

IPv4: 192.168.1.253 Netmask: 24 MTU: 1500

GRAPH	PHYSICAL INTERFACE	MAC ADDRESS	TX COUNT (IN BYTES)	RX COUNT (IN BYTES)	INTERFACE MODE	MTU
	gre1	5a:a9:bb:cb:90:d3	30342409	5608036	L2 tunnel: Remote IP: 1.2.3.5 N/A	1280
	LAN 1	00:09:90:01:59:f4	11398972	35747363	Negotiated 100 baseTX FD, link ok	1500
	LAN 2	00:09:90:01:59:f5	0	0	no link	1500

GRENET

IP CONFIGURATION

IPv4: 1.2.3.4 Netmask: 24 MTU: 2000

GRAPH	PHYSICAL INTERFACE	MAC ADDRESS	TX COUNT (IN BYTES)	RX COUNT (IN BYTES)	INTERFACE MODE	MTU
	WiFi 1	00:09:90:01:59:f2	33363607	7016704	Role: Access Point (infrastructure) SSID: MYSSID Channel: 48	1500

We can then verify that the passage of traffic in the tunnel is operational using a PING or an iPERF

NOTE: Due to the overhead introduced by the packet encapsulation in the GRE tunnel, the MTU of the tunnel is limited to 1280 bytes. This means that if the network sends packets with the maximum length allowed on the Ethernet, i.e. 1500 bytes, these packets will be silently dropped at the entrance of the tunnel. It is therefore necessary, in this case, to limit the MTU of your network to 1280.

Note that if the tunnel only goes through the WiFi interface (the two endpoints are the AP and the Client, as in our example), the 802.11 standard allowing packet lengths up to 2304 bytes, it is possible to increase the MTU of the WiFi interface to 2000. The MTU of the tunnel can then be increased to 1500, and you will not need to limit the MTU of your network.