ACKSYS
COMMUNICATIONS & SYSTEMS

APPLICATION NOTE

APNUS032 How to Configure NAT Port Forwarding

July 2023

Content

1. Glossary

NAT : Network Address Translation

PAT: Port Address Translation

GW: Gateway

DHCP: Dynamic Host Configuration Protocol

TCP:Transmission Control protocol

UDP:User Datagram Protocol

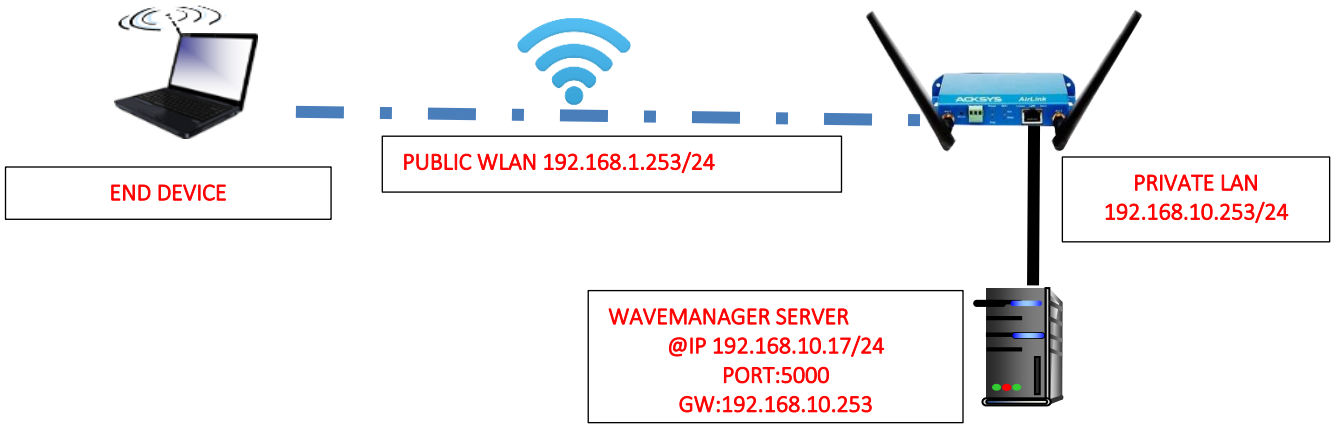
2. Introduction

All IP packets have a source IP address and a destination IP address. Typically, with NAT, packets passing from the private network to the public network will have their source address modified, while packets passing from the public network back to the private network will have their destination address modified.

The aim of this application note is to show in details the configuration steps to configure the NAT port forwarding on ACKSYS router.

3. Port Forwarding Configuration architecture

In this application note, we will explain in detail a practical step-by-step how to configure port forwarding on Acksys Router to reach in a private Network WaveManager Server connected on LAN Interface via Public Network.



Before we begin, let's overview the configuration that we are attempting to achieve and the prerequisites that make it possible in this application note :

- AirLink or Any type of Acksys Router
- WaveManager Server connected in AirLink LAN interface
- Laptop to configure the router

Networks	Public IP: 192.168.10.253 SSID=PAT
	Private IP: 192.168.1.253
Zone/Firewall	Public Zone with Masquerade enable
	Private Zone
WLAN DHCP server	Range 192.168.1.100 & .150
WaveManager	IP:192.168.10.17/24 GW:192.168.10.253 Port:5000

4. ACKSYS Router configuration

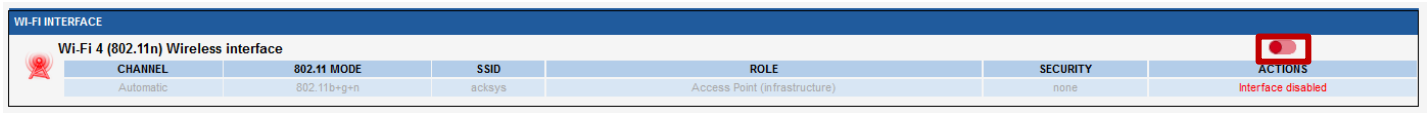
The first step is configuring the AirBox router. For this, you will need to connect a network cable between your PC and AirBox router, and then open an Internet browser. The default IP address is 192.168.1.253 reason why your PC should be configured using a static IP address in the range 192.168.1.X

Configuring Network Interfaces

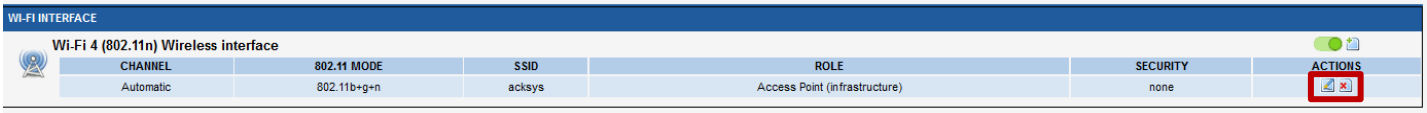
If you have familiarized yourself with the configuration scheme and we can start configuring the router using instructions provided. We will create two Network called Public and Private

CONFIGURING SSID FOR PUBLIC NETWORK

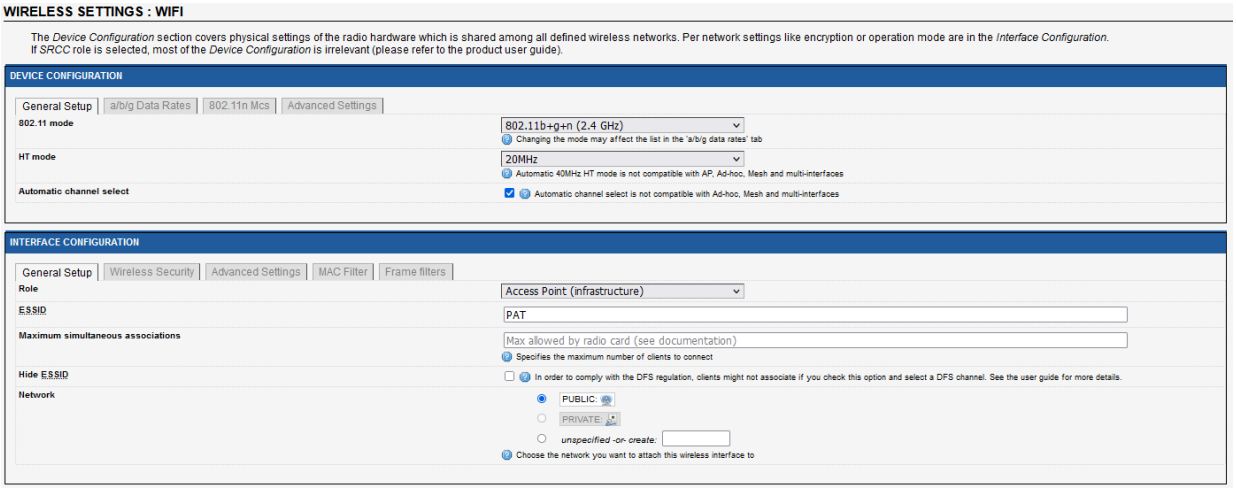
By default the WiFI Adaptor is disabled therefore in this application note, we will create an SSID to associate to the WIFI adapter to allow end device connected on its.
In the GUI, go to Setup → Physical Interfaces → Click WiFI Adaptor to On



- Click the "Edit" button located to the right and your SSID configuration page:



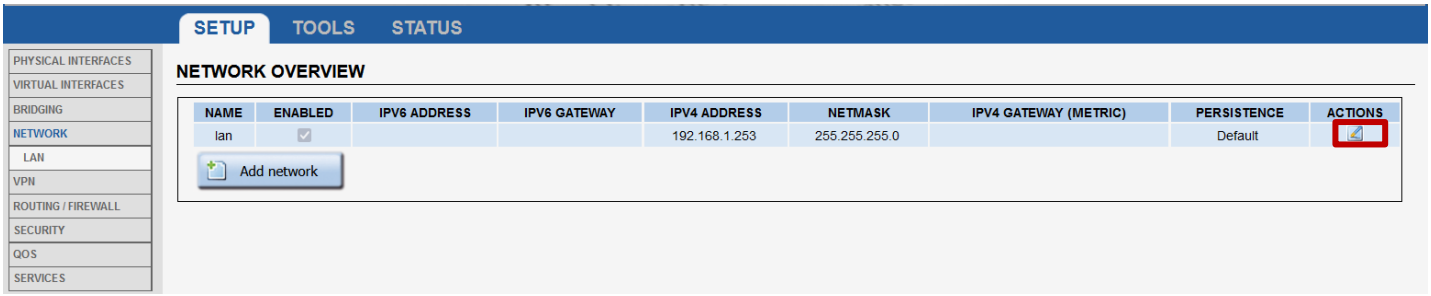
- Role: Access Point
- ESSID: PAT
- Network: PUBLIC
- Click on Save



- Security: No encryption (only in this note but we invite partner to set a strong password)

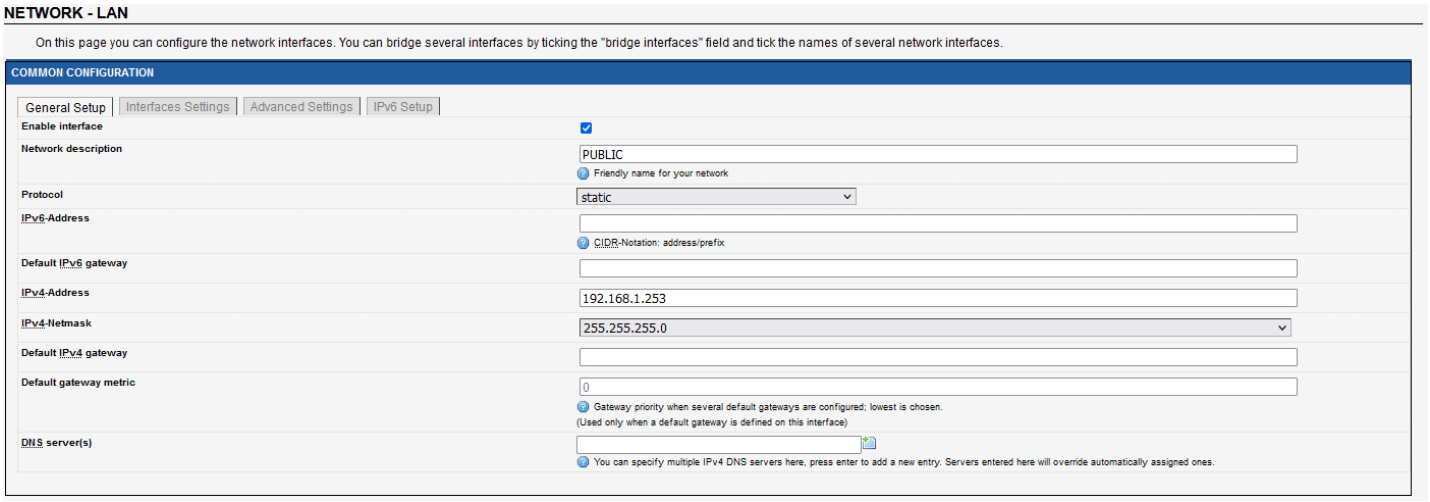
PUBLIC NETWORK

In the GUI, go to Setup → Physical Interfaces → Edit LAN Interface

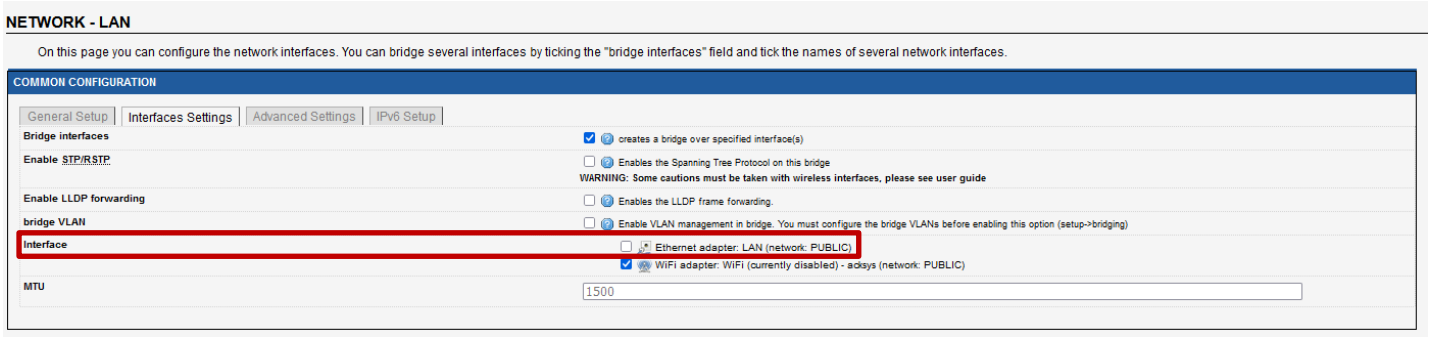


Click the "Edit" button located to the right and let configure LAN Interface.

- General Setup
  - Network description :PUBLIC (use your custom name)
  - Protocol: Static
  - Select IPv4 Address IP family : 192.168.1.253
  - IPv4-Netmask:255.255.255.0
  - Save

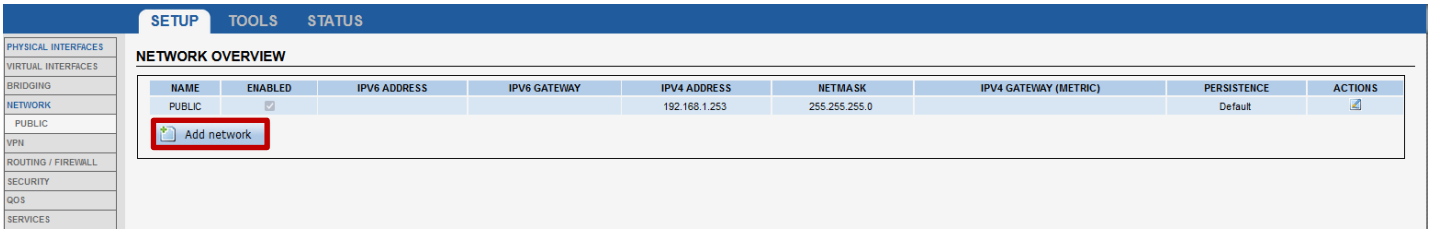


- Interface Settings
  - Bridge Interfaces: Click to enable
  - Interface: Unclick Ethernet Adapter to use WIFI adapter for public Network
  - Click Save

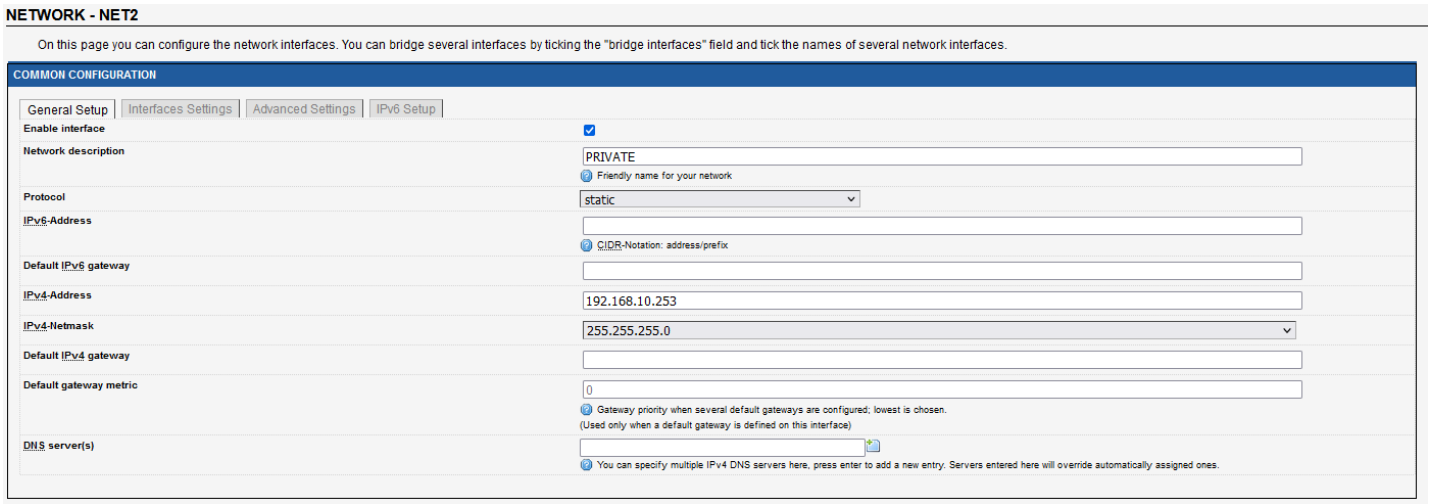


PRIVATE NETWORK

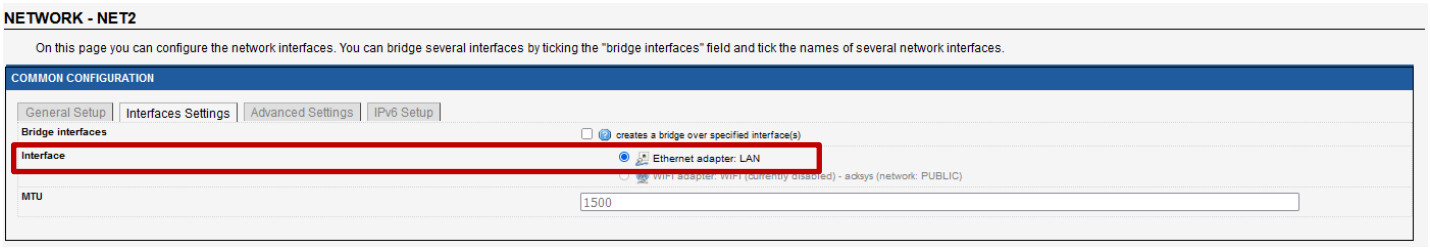
Click the "Add network" button to add the Private Network and let configure its.



- General Setup
  - Network description :PRIVATE (use your custom name)
  - Protocol: Static
  - Select IPv4 Address IP family : 192.168.10.253
  - IPv4-Netmask:255.255.255.0
  - Save

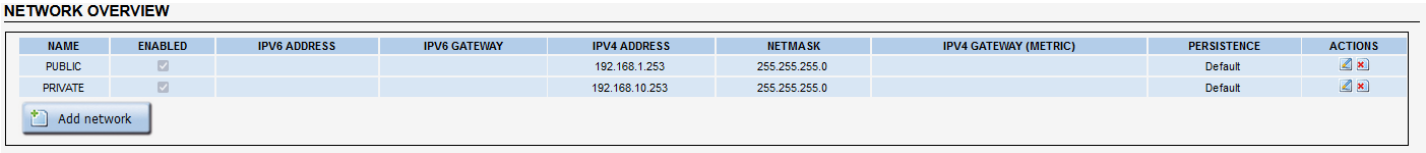


- Interface Settings
  - Bridge Interfaces: unclick to disable
  - Interface: Click Ethernet Adapter to use LAN adapter for private Network
  - Click Save



NETWORK OVEVIEW

Let have an overview on Network created for Private and Public.

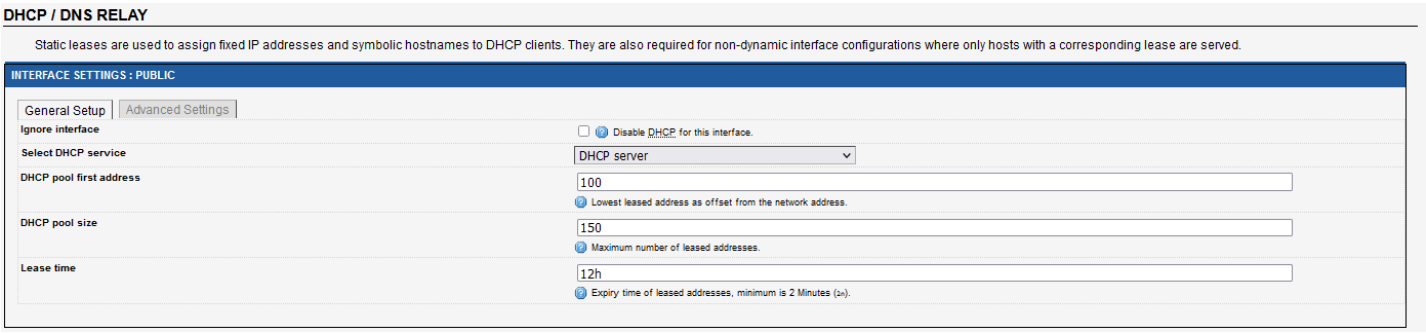


Configuring DHCP Server on WIFI Interface (Public Network)

By default, the DHCP server is disable and to allow end devices to receive IP address, we will configure the DHCP server with the default following information:

In GUI and go to Setup → Services →DHCP/DNS RELAY

- LAN Interface is enable DHCP
- Select DHCP service: DHCP server
- Save and Apply

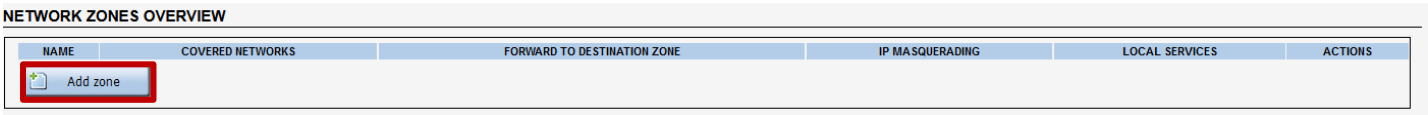


Configuring Network Zones

In this section, we will create 2 Network Zones (PUBLIC and PRIVATE) mapping the both Networks created already created.

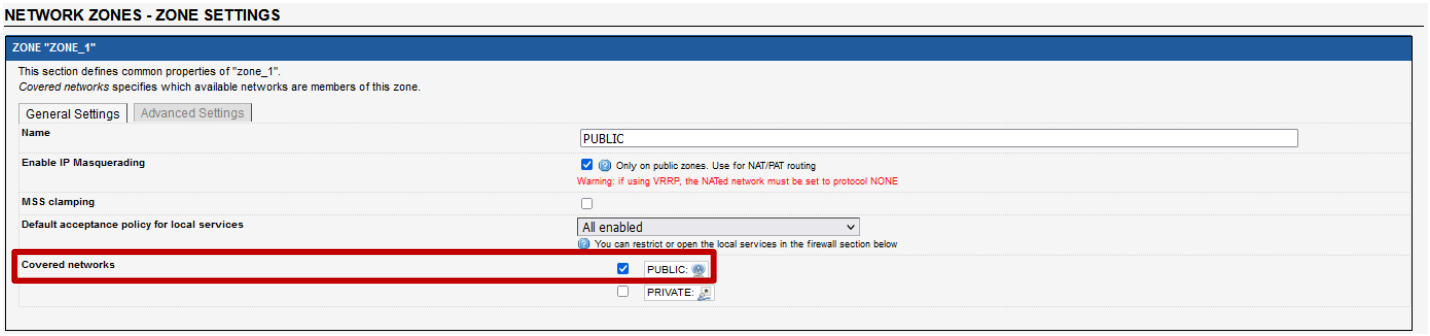
PUBLIC ZONE

In the GUI, go to Setup → Routing /Firewall → Network Zones → click on Add Zone to create the Two Network Zone



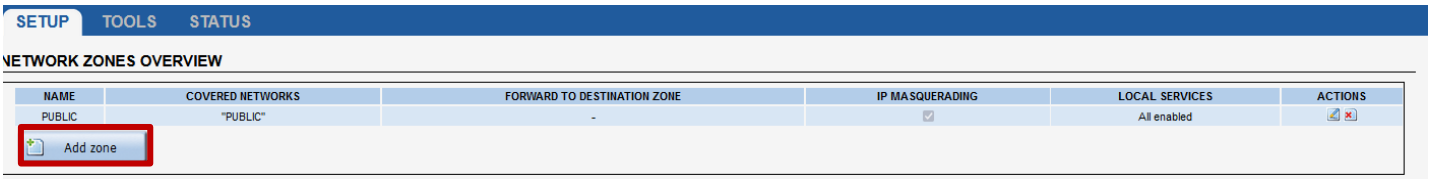
As soon as clicking in Add zone, we will be redirected to the network zone configuration

- General Setup
  - Name: PUBLIC (use your custom name)
  - IP Masquerading: Enable
  - Covered Networks: PUBLIC
  - Save



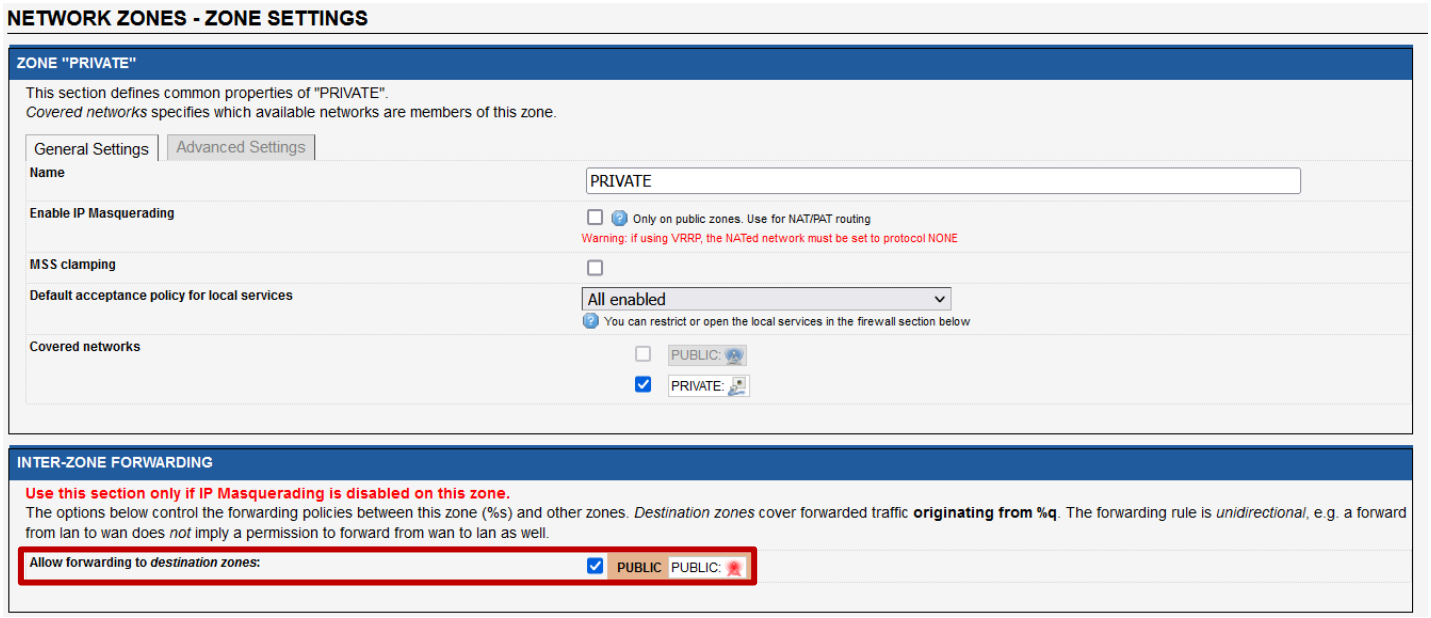
PRIVATE ZONE

In the GUI, go to Setup → Routing /Firewall → Network Zones → click on Add Zone to create the Private Network Zone



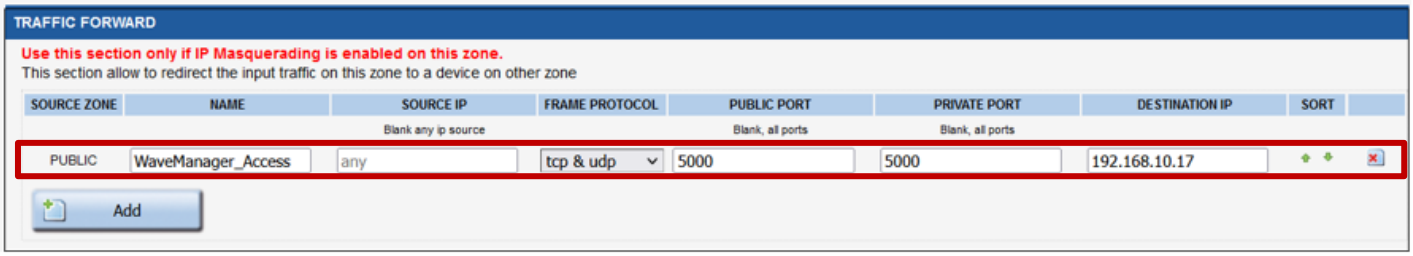
As soon as clicking in Add zone, we will be redirected to the network zone configuration

- General Setup
  - Name: PRIVATE (use your custom name)
  - IP Masquerading: Disable
  - Covered Networks: PRIVATE
- Inter-Zone Forwarding
  - Allow forwarding to destination zones: PUBLIC
  - Save



Configuring Port Forwarding Rule (on Public Zone)

In the GUI, go to Setup → Routing /Firewall → Network Zones → Edit Public Zone et create the new rule below:

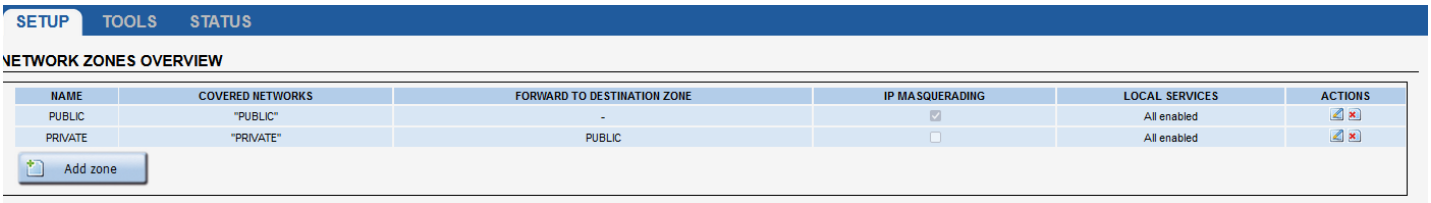


The rule above redirects all PUBLIC tcp/udp incoming traffic from the router on port 5000 via WIFI connection to private port 5000 on the IP 192.168.10.17, i.e. port 5000 on the WaveManager Server.

Field Name	Value	Description
Source Zone	Public	Your custom zone name covered the network
Name	WaveManager Access	Name of your custom
Source IP	Any	The network/mask or the source IP address
Frame Protocol	TCP&UDP	Type of protocol of incoming packet
Public port (destination port)	5000	Traffic will be forwarded from this port on the Public Network
Private port (destination port)	5000	The rule will redirect the traffic to this port on the internal machine
Destination IP	192.168.10.17	The IP address of the WaveManager that hosts want to access from the Public Zone

NETWORK ZONE OVERVIEW

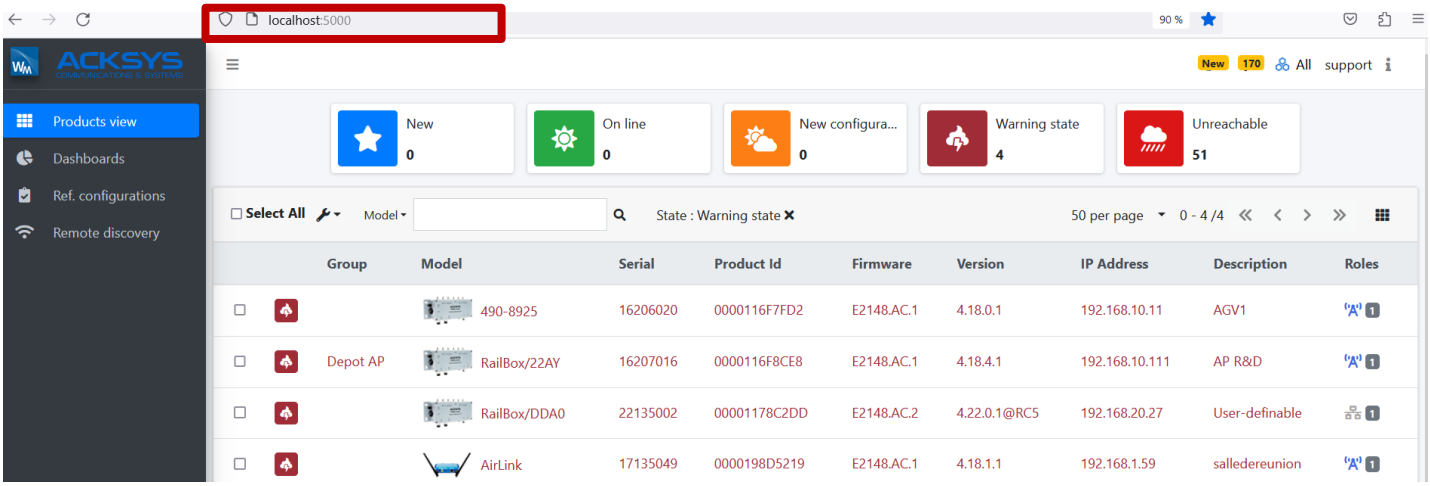
We have now created the two network zones , private and Public to manage network traffic through the router.



Now, we must Apply and Save button to restart the router for the configuration to be effective. The final step is to connect WaveManager Server to the Acksys Router using an Ethernet cable.

Configuring the WaveManager Server (in the private network)

The last step is to configure the WaveManager Server. This application note will not enter in detail regarding the steps to be installed and configure WaveManager server. However, below is a screenshot of the configuration of the WaveManager in local address: http://localhost:5000



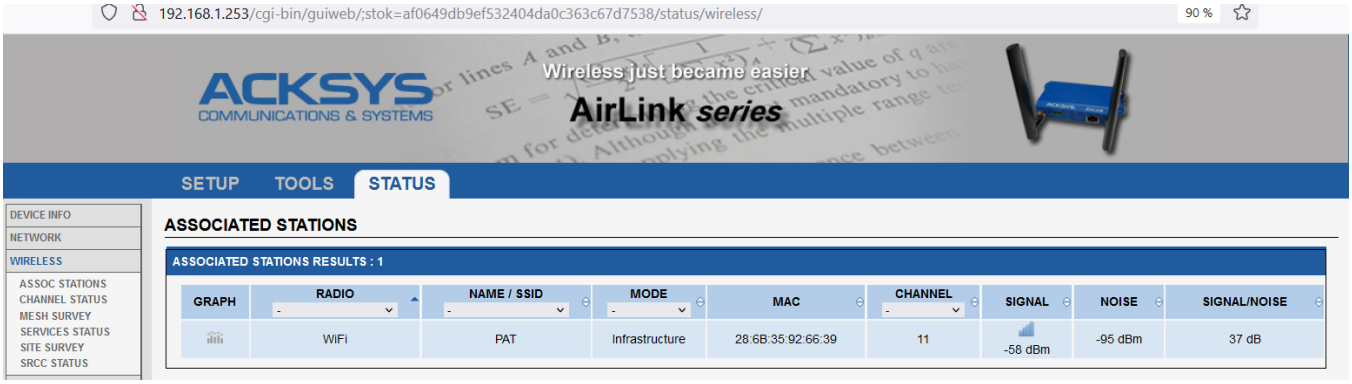
In summary, the WaveManager Server listened by default on port 5000 and it is installed on a Windows 10 Laptop with the below network parameters:

- IP Address: Fixed IP address (DHCP disabled) 192.168.10.17
- Netmask 255.255.255.0.
- Gateway: The Acksys LAN IP address 192.168.10.253
- WaveManager Listen Port: 5000

Finally, the web port has been chosen as TCP 5000 for simplicity (this way, via port 80 the Acksys Router configuration can be accessed remotely, and via port 5000 the IP WaveManager can be accessed).

Router: WiFi Status

First of all let test a wireless connection with an end device to the AP with the SSID named PAT before checking the redirection rule. Windows In GUI and go to **Status** → **Wireless** to verify if WIFI clients is connected to the routeur.



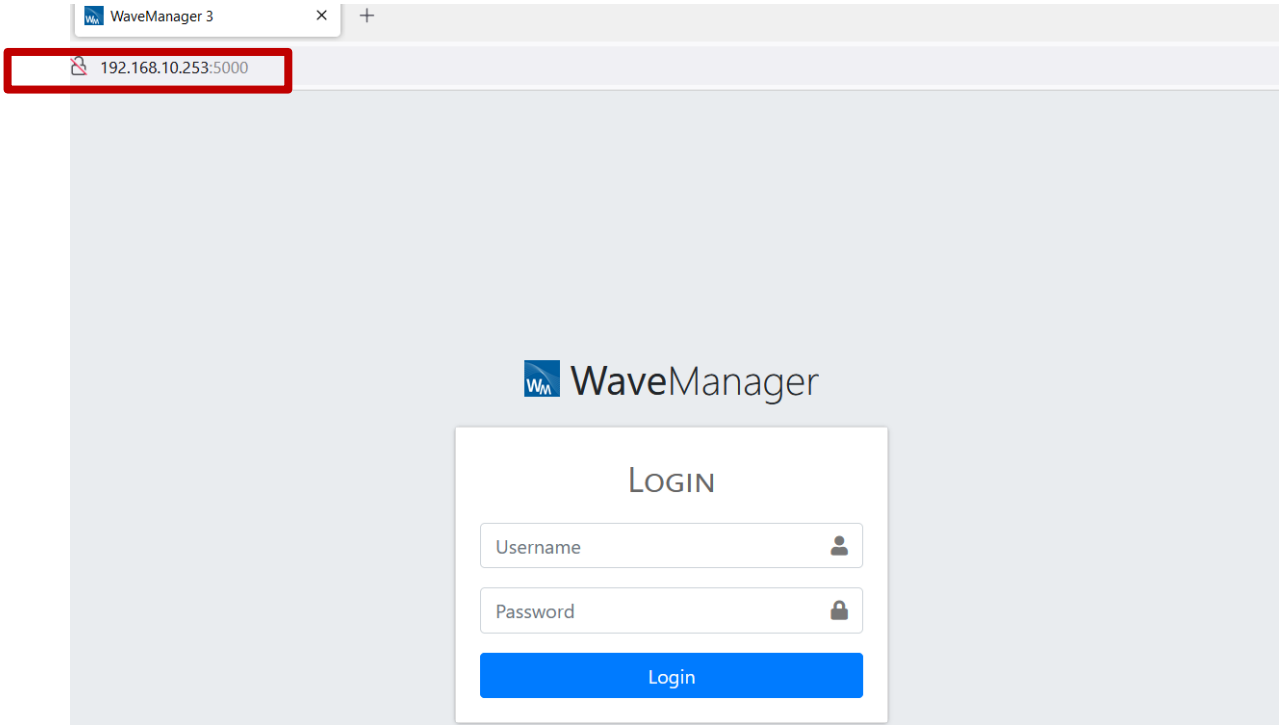
6. TESTING

The final step is to connect the laptop end device on the public zone to the WaveManager Server which is installed on the private zone.

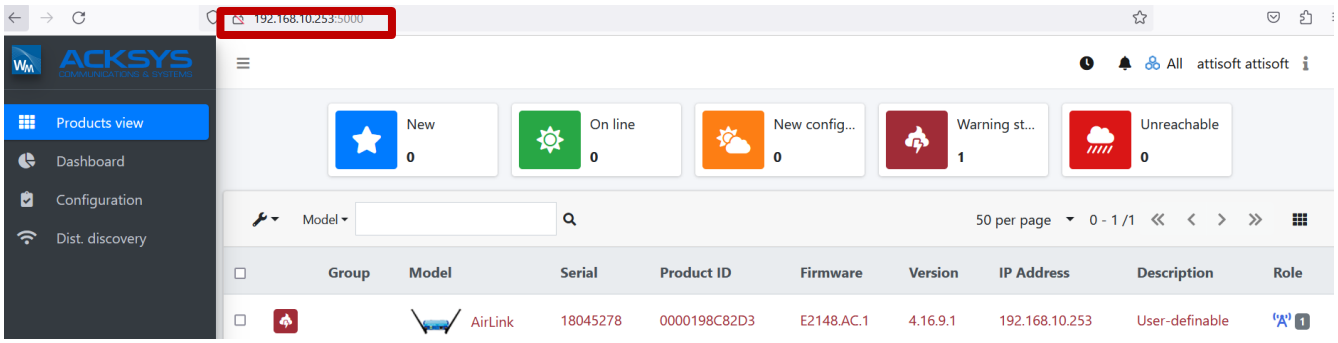
If you've followed all the steps presented above, your configuration should be finished. But as with any other configuration, it is always wise to test the setup in order to make sure that it works properly In order to check that we have correctly configured everything.

To confirm that port forwarding is working properly, we should be able to access the Wavemanager through the router **public IP: public port**:

We will then be redirected to WaveManager login page with http:192.168.1.253:5000. (192.168.1.253 is the Router public IP).



As seen the port forwarding works as expected with the public IP with the public port configured in Routing/Firewall section.



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