TITAN ROUTER

Application Note 70

ZeroTier VPN

Easily access your Titan router configuration and connected devices via VPN.

1. Scenario Details

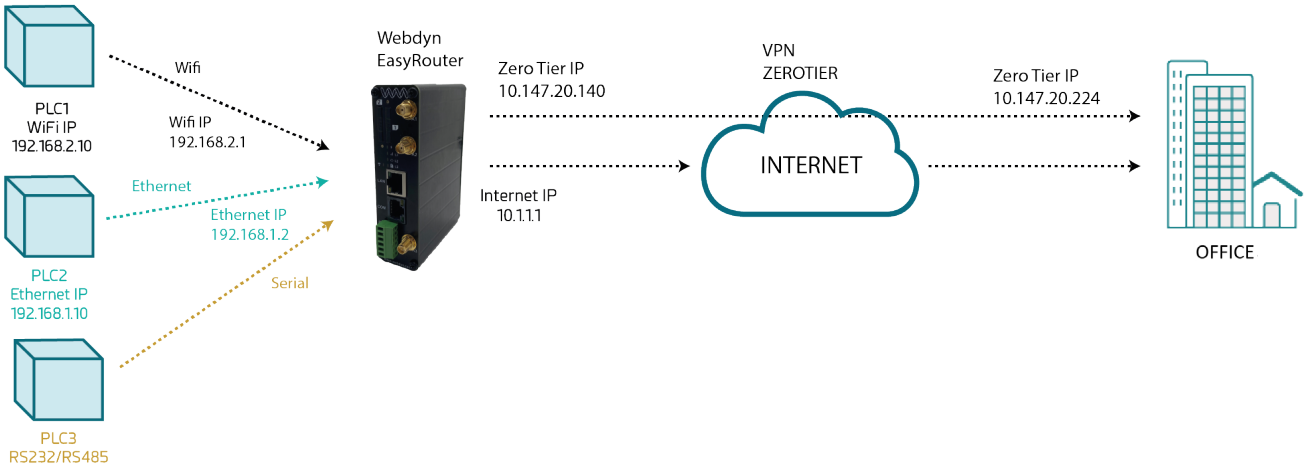
TITAN routers have all the typical functionalities of 4G/3G/2G routers, as well as a series of added features that make them one of the most feature-packed routers on the market. One of their additional features is the ability to establish a VPN through the ZeroTier service, which allows easy access to the router and the devices connected to it regardless of whether the router connects to the internet via Wifi, Ethernet or SIM card, or whether the SIM has a private IP address or is behind conventional firewalls, etc.

2. Description of the Scenario in the Example

- A Webdyn-Easy-Router device (hereinafter referred to as the Titan router) is connected to the Internet via an inexpensive SIM card that provides a private IP address of the type 10.X.X.X.

- The Titan router will have 3 devices connected. A PLC (1) will be connected via Wifi to the Titan router, as this will be configured as a Wifi Access Point. Another PLC (2) will be connected to the Titan router via an Ethernet cable. Finally, another PLC (3) will be connected to the Titan router via an RS485 serial connection.

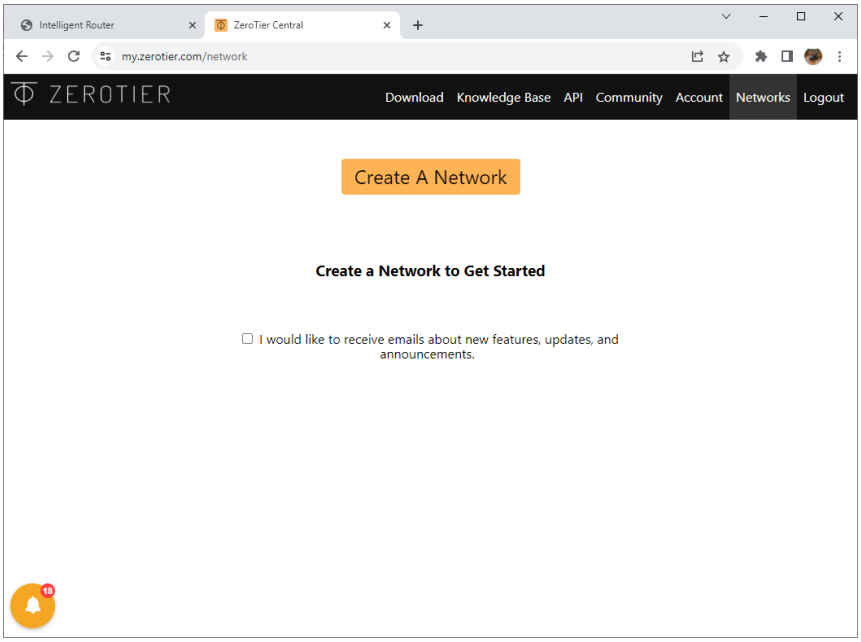
- The Titan router's configuration menu, as well as the TCP port 81 of PLC1 and all the IP services of the PLC2 router and the RS232/RS485 serial port of PLC3, must be accessible from a remote office.



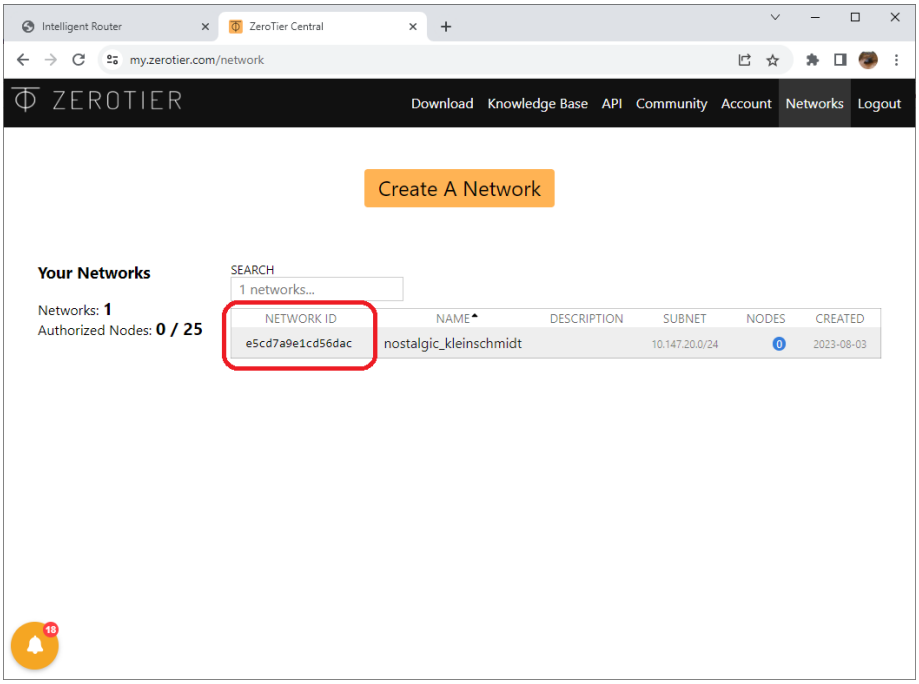
3. Registration for the ZeroTier service

ZeroTier is a service that allows you to very easily implement a secure VPN connection. The registration process for the system is shown below.

To register, go to the URL https://my.zerotier.com. Once the process has been completed, the following page will be displayed:

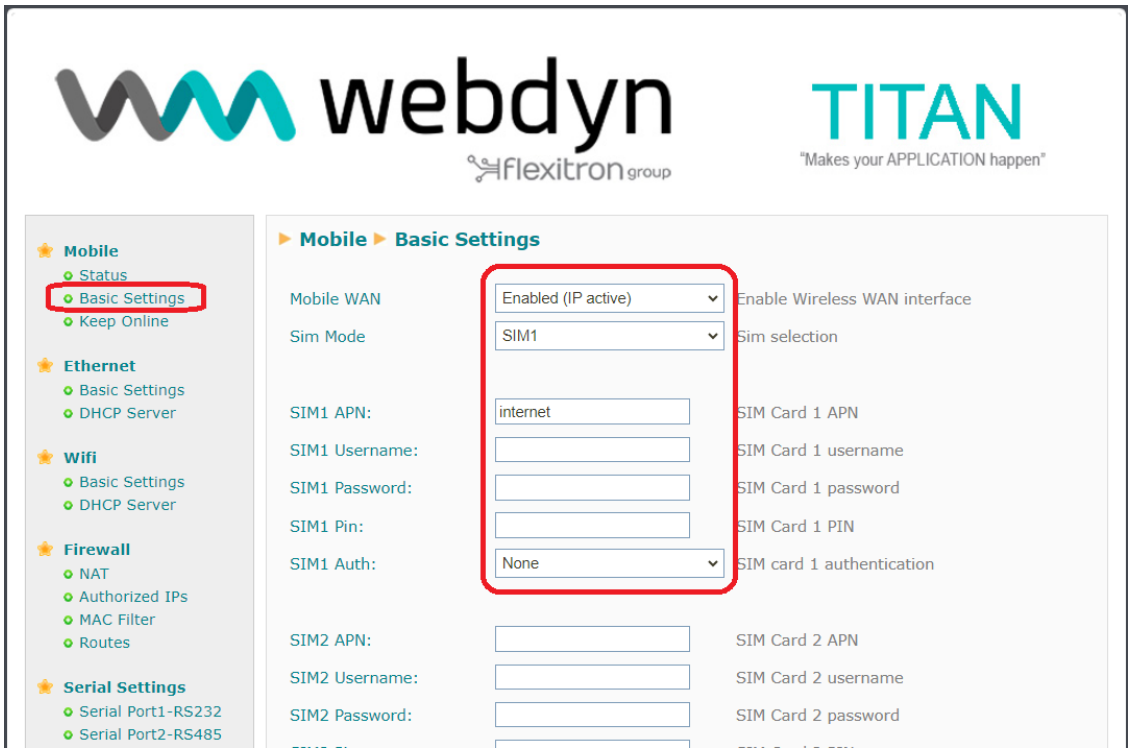


Click on the “Create A Network” button to create a new personal network within ZeroTier. A network with a “NETWORK ID” e5cd7a9e1cd56dac will automatically be created.



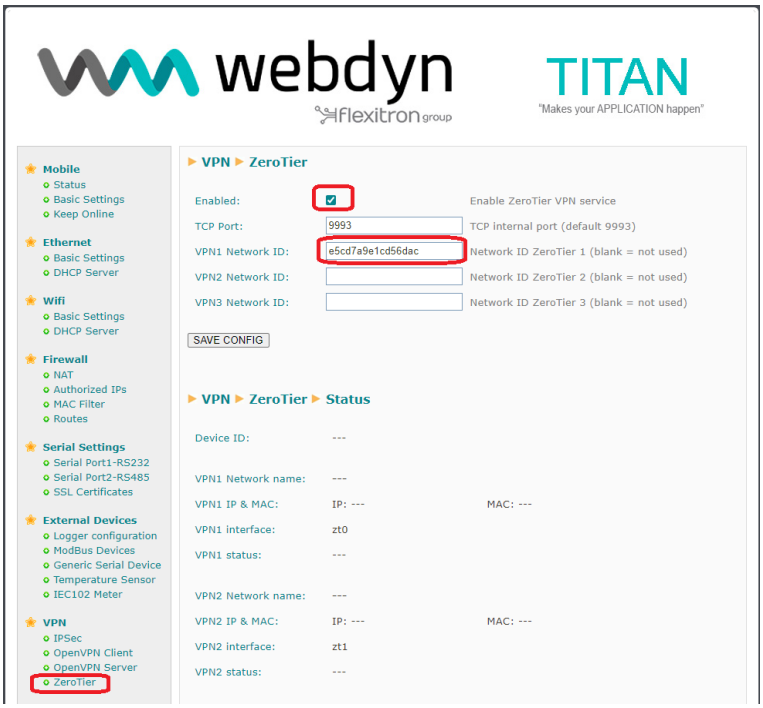
4. Configuring the Titan router for Internet connection via SIM card

To configure the Titan router for Internet access via a SIM card, go to the menu “Mobile > Basic Settings” and fill in the necessary data (APN, Username, Password, PIN, Authentication, etc. of the SIM card). Once this is done, press the “SAVE CONFIG” button.

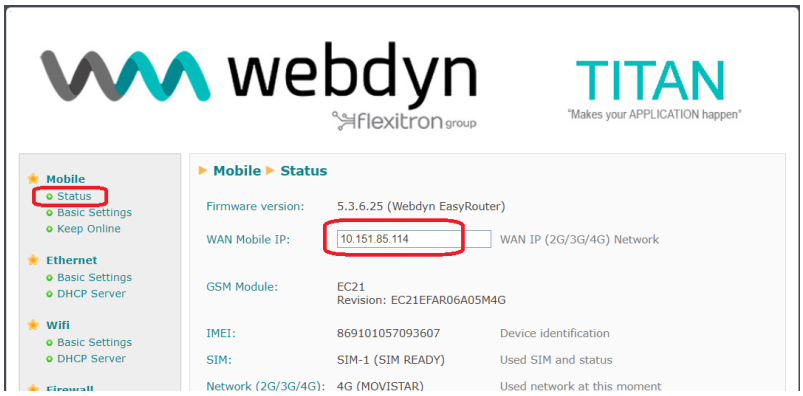


5. Configuring the ZeroTier service in the Titan router and registration on the ZeroTier platform.

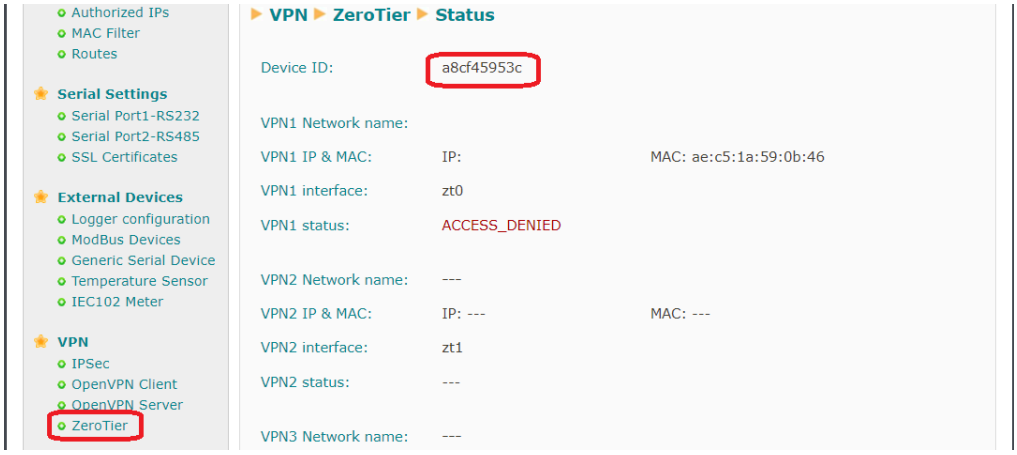
Configuration of the ZeroTier service on the Titan router is very simple. Simply go to the menu “VPN > ZeroTier”, enable the service by clicking on the “Enabled” box and enter the “NETWORK ID” obtained in point 1 of this document (in this example “e5cd7a9e1cd56dac”). Once this has been entered, the router must be rebooted via the menu “Other > Reboot”.



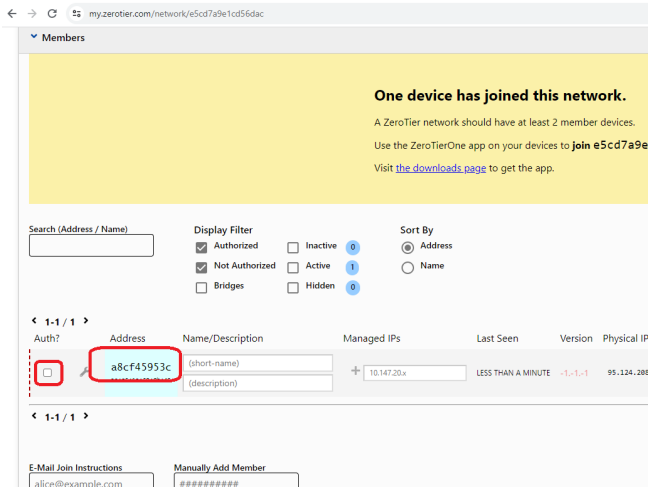
After restarting the Titan router, the IP obtained from the SIM can be found in the menu “Mobile > Status”.



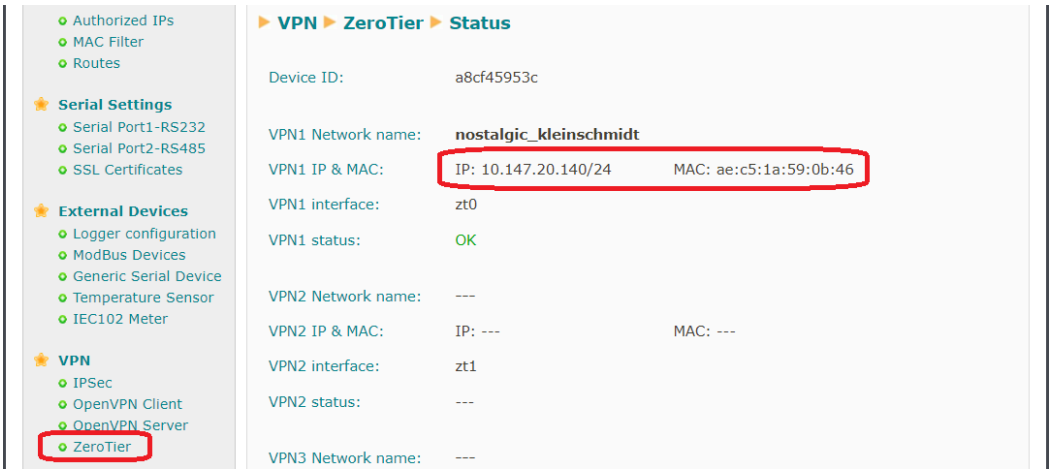
In the menu “VPN > ZeroTier”, the “Device ID” obtained by the Titan router to identify itself in the ZeroTier VPN network will be displayed (in this example “a8cf45953c”). An “ACCESS_DENIED” message also appears on the screen. This is because the device has not yet been accepted in the ZeroTier network.



To accept a new device in the ZeroTier network, go back to the “my.zerotier.com” control panel. In the “Members” section of the network you will see that the new device with ID “a8cf45953c” is pending authorisation. Simply check the “Auth?” box.

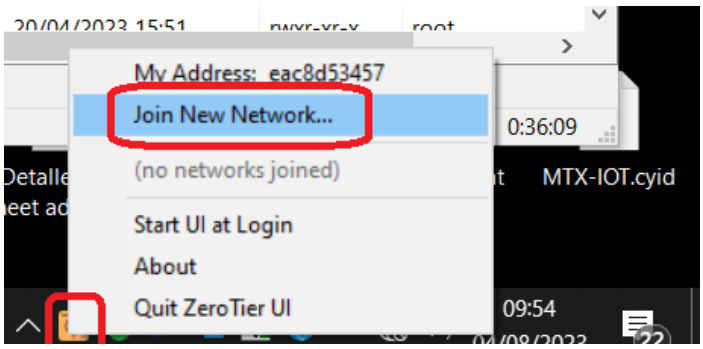


After clicking and accepting the device, if you refresh the screen of the Titan router menu “VPN > ZeroTier”, the device will appear as connected and with its IP and MAC assigned by the ZeroTier network, in this case IP: 10.147.20.140.



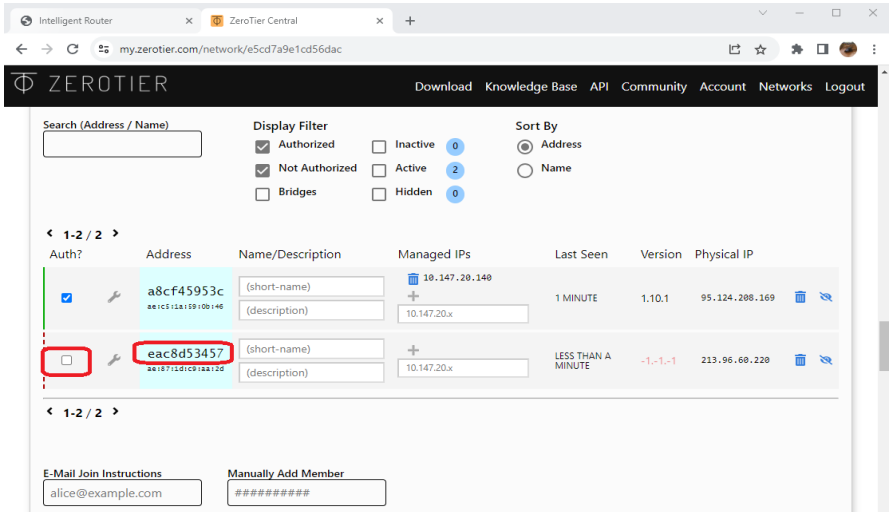
6. Configuring the ZeroTier service on a Windows PC to connect to the device.

A version for desktop PC (Windows, Linux, MAC) or mobile (Android or iOS) can be downloaded from https://www.zerotier.com/download/. Once the software is installed, simply configure the NETWORK ID of the network to connect to. In this case the NETWORK ID will be the same as the one obtained in point 2 of this document: e5cd7a9e1cd56dac. Right-click on the ZeroTier icon and click on the “Join Network” icon.

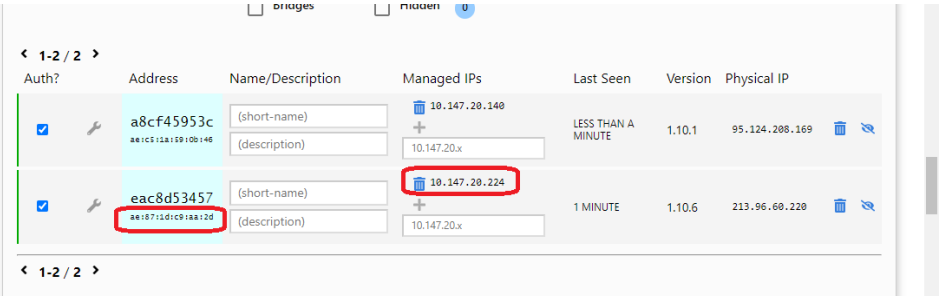


A pop-up window will appear. Enter the network ID and then click the “Join” button.

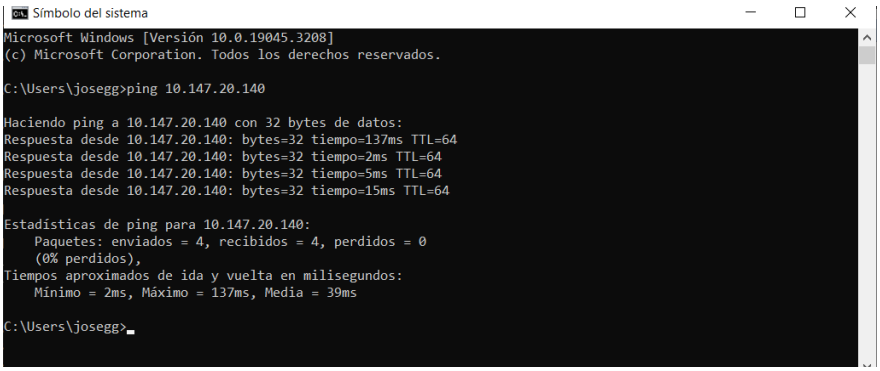
The new device (our PC) must be accepted in the ZeroTier control panel in the same way as you did to accept the Titan router in the network.



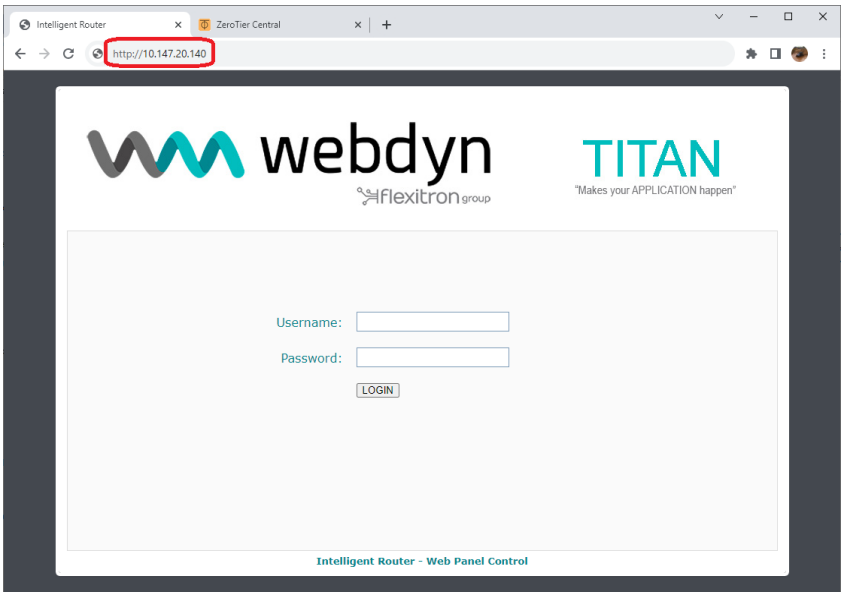
... after that you will be connected to the network with your assigned IP and MAC.



If a DOS console is opened, you can check the communication with a simple PING from the PC to the Titan router.

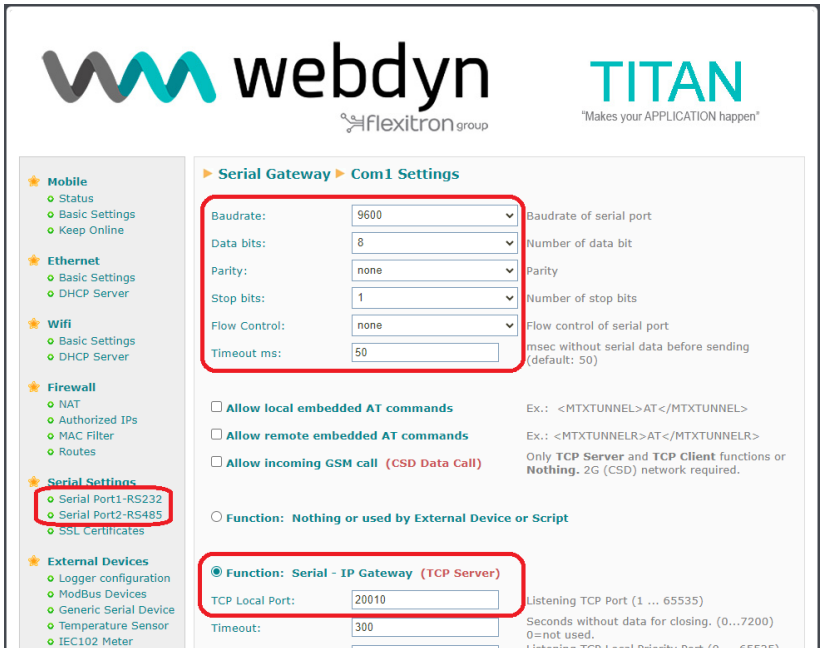


And you can also access the WEB configuration interface of the Titan router from the PC by specifying the ZeroTier IP address assigned to the Titan router by the ZeroTier network, in this example: http://10.147.20.140



7. Accessing the device with RS232/RS485 serial connection (PLC3)

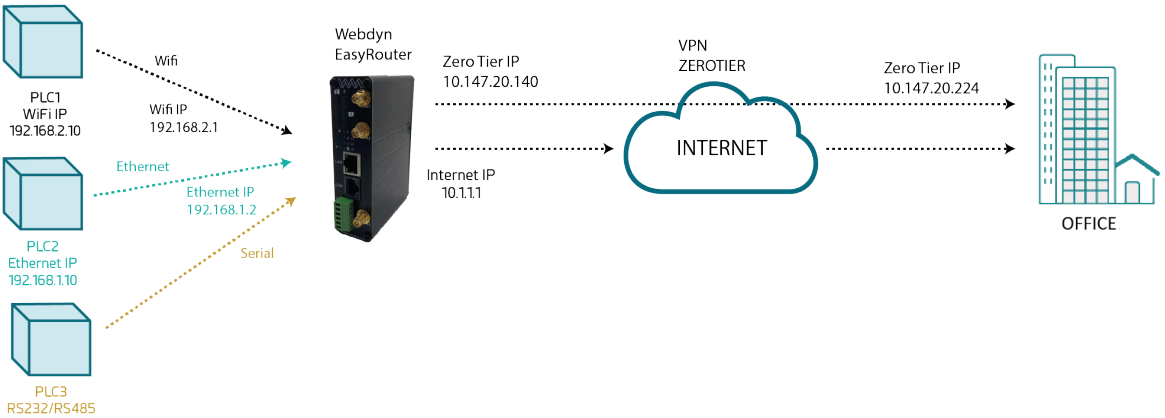
To access the RS232 or RS485 serial port of the PLC device, simply configure an IP-RS232 or IP-RS485 gateway on the Titan router. This can be done from the "Serial Settings > Serial Port1-RS232" or "Serial Settings > Serial Port2-RS485" section depending on whether you need to access an RS232 or RS485 port (also possible with two ports simultaneously) and by configuring the appropriate serial port parameters (which must match those of the PLC3 serial port). To do so, simply select "Function: Serial - IP Gateway (TCP Server)" and specify the TCP port to be used in the gateway, in this case TCP port 20010.



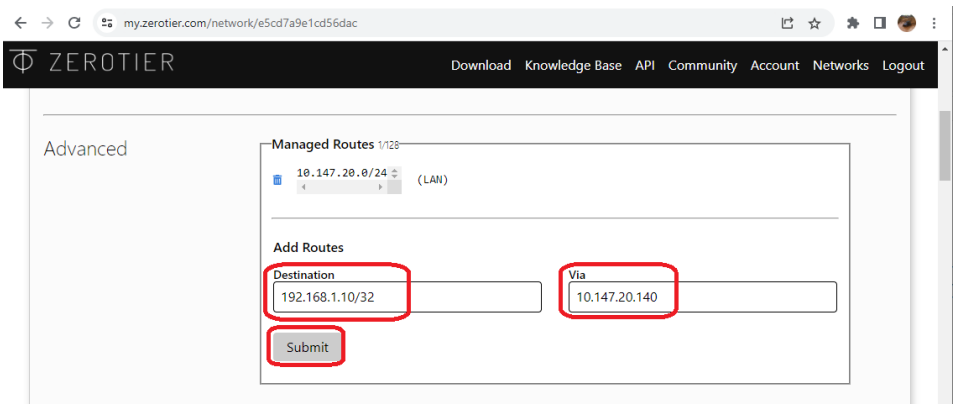
Once the Titan router has rebooted, it is possible to access the RS232 port of the PLC3 equipment by connecting any application to TCP port 20010 from the IP address 10.147.20.140 (10.147.20.140:20010).

8. Accessing the device with Ethernet connection (PLC2)

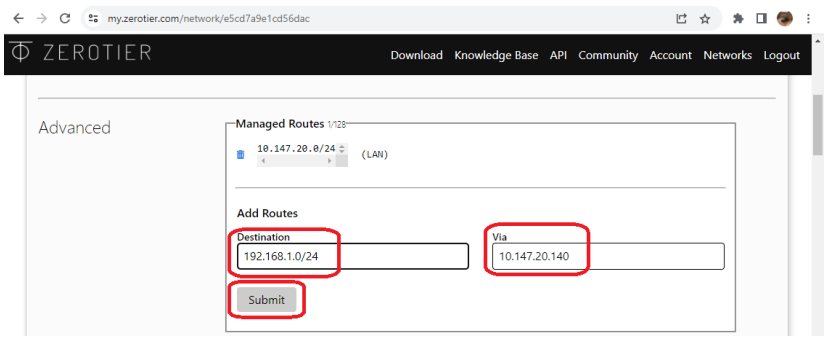
The aim is to be able to access all the PLC2 services. The PLC2 has an Ethernet connection to the Titan router. Reminder of the wiring diagram:



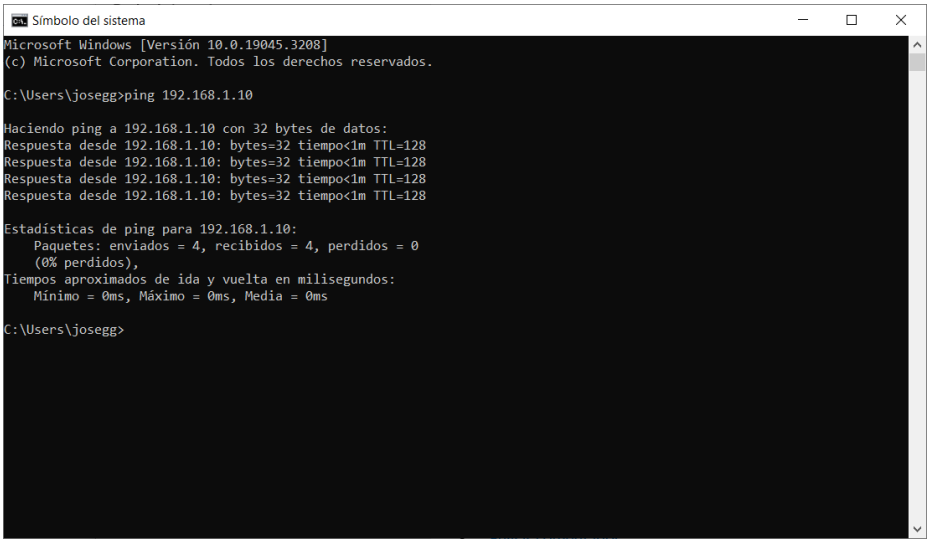
In order to directly access the PLC2 device with its IP 192.168.1.10 from the OFFICE, a route must be created from the ZeroTier control panel, indicating that to reach the device 192.168.1.10 it must be done through the ZeroTier IP of the Titan router, namely IP address 10.147.20.140. To do this, the following route must be added "10.147.20.140 > 192.168.1.10/32" as follows:



If there were more devices to be accessed within the 192.168.1.X network (e.g. because the Titan router was connected to several Ethernet computers via a switch), the following route could be added to access that entire network:



To test communication with PLC2, simply PING from the control PC to PLC2's local IP 192.168.1.10.



9. Accessing the device with Wifi connection (PLC3) via NAT

In this example, it is not the intention to access all PLC3 IP services, i.e. all TCP ports that PLC3 might have open. In this example, we only need to access TCP port 81 of the local IP 192.168.2.10 of PLC3 via NAT, i.e. via the ZeroTier IP of the Titan router 10.147.20.140 and TCP port 81.

To do this, simply access the Titan router via the menu "Firewall > NAT" and configure a rule as shown below, and then reboot the router.