HOW TO USE PIRANIA?

Lessons from real use on community networks
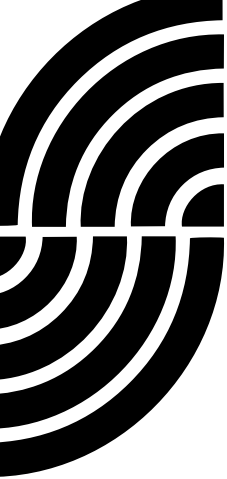
Index

Locnet Communities of Practice

This manual is the result of one of the projects undertaken by the communities of practice (CoPs) supported by the Local Networks (LocNet) initiative. LocNet is a collective effort headed by Rhizomatica and the Association for Progressive Communications (APC) that works with partners in Africa, Asia and Latin America and the Caribbean. Its goal is to support the development of bottom-up approaches for the construction of communications infrastructures known as community networks (CNs)[1]. APC and Rhizomatica want to contribute to an ecosystem that permits the emergence and growth of such networks. To achieve its goals, LocNet adopts various strategies related to exchange among peers and institutional strengthening, training and tutoring, policy and promotion, technological innovation and sustainability, and gender and women's participation.

In recent years, LocNet has provided advice, financial resources and forums to support various CNs and other partners. The purpose of the CoPs is to increase collaboration among community networks worldwide through online collaborative spaces created in relation to different topics of interest for CN professionals.

The CoPs approach includes activities seeking to enhance support on key issues of interest for the CN community, bringing together the different lines of work in technology and innovation from previous years. In this sense, a CoP is a group of people who share a common concern, a set of problems or interest in an issue and who join forces to pursue both individual and collective goals. CoPs are often centred on exchanging best practices and creating new knowledge to drive advances in a given area, and one of their crucial components is constant interaction.

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1   These initiatives are best understood as a collective undertaking by local communities to connect in a meaningful way and construct relevant digital networks. Since 2017, the LocNet initiative has accompanied and supported their efforts.

Why sustainability is of interest for community networks

LocNet's CoPs approach brings together people and activities aimed at enhancing support for key issues of interest to community networks, which includes addressing not only the lack of connectivity and digital exclusion, but also other basic human rights of marginalised communities, having as a goal meaningful uses of the internet and digital technologies to meet specific needs such as empowerment against discrimination and oppression, and pursuing a better quality of life collectively and individually. In addition to technical aspects, funding sources and a good regulatory environment, the continuity of a community network depends on human relationships and the meaning that network will acquire in the daily lives of various communities. Looking at the different aspects that sustain community networks, therefore, is a fundamental part of the process.

Bearing in mind that human, social, environmental and technological practices should not be dissociated, LocNet's CoPs worked so that the knowledge produced and exchanged met this premise in a holistic way. In order to do that, the CoP on Sustainability has sought ways to give back to the local and circular economy by using community networks (through documentation and improvement of time bank methodologies and tools, social currencies and captive portal); encouraging the production and use of local content and platforms; and researching the main obstacles to the implementation and sustainability of community networks, considering them as common goods and not a telecommunications service.

The topics and methodologies for these learning exchanges and forms of interaction were defined collectively and not hierarchically, with the goal of the inclusion of gender, race/ethnicity, diverse abilities and different levels of knowledge, validating empirical knowledge and promoting an environment free of prejudice. Our goal is to use this approach to incentivise and share the dynamics of technology design and production, and sustainability practices that are community-centred and take into account the situatedness of tech practices from the start.

We hope you enjoy the following pages, give us feedback, share your comments and ideas, and join LocNet's CoP on Sustainability for new undertakings and co-creations: https://t.me/+Gvy90-aem-I2MDJh

Introduction: Why install the Pirania Captive Portal on a community network?

This manual was produced based on the real-life experience of installing the Pirania Captive Portal on a community network in Vale do Ribeira, in the southern region of the state of São Paulo, Brazil. A group of women who are part of the Rede Agroecológica de Mulheres Agricultoras (Agroecological Network of Women Farmers – RAMA) and young people from the territory take care of this network. Activists of the Portal Sem Porteiras (Gateless Portal) community network from Monteiro Lobato, São Paulo, who have been using the captive portal for a longer period, were involved in the experience, which has allowed the two community networks to share their knowledge with each other.

The portal was installed because the community had a real and pressing demand: to secure network access to people who somehow contribute to its sustainability. The Pirania Portal works as a network access controller: when a device accesses the network, it is redirected to a login screen that requires entering a personal password.

As any process that involves a community network should be, the Pirania Captive Portal was a solution found **based on a demand from the territory**, presented by the RAMA. The response to their demand was collectively discussed and conducted, inspired by the principles of popular education, which welcomes the demand and carries out work by addressing problems and fostering autonomy, emancipation, and collective and shared knowledge-building. The community was involved from the moment the demand was presented and through every step of the portal installation process.

On this community network, as well as on many others, internet connection comes from a private provider, which charges for the service it provides. When building our network, we have always aimed at alternatives that could make it as democratic as possible, so that the largest number of people have internet access without having to pay for it. Building networks like this includes, for example, demanding public policies designed to secure access to communication, in which the state

takes responsibility for providing internet connection, which is managed by the community infrastructure. These demands, however, can take a long time and depend on several factors to be successfully met. In the meantime, establishing a community network by hiring a private provider could be an option. This poses a question: how is it possible to support the structure of the project amid all the hardships endured by the territory –especially financial hardships?

The Pirania Captive Portal is helpful in that sense, because it operates as network access control. This is a form of access in which each person has their own personal password to connect to the internet, instead of having one general password (which can be easily shared, including with people who do not economically contribute to the sustainability of the network). At some point in your life, you probably have connected to the internet through a captive portal, at a public square or a hotel, for example. Usually when we access a portal like this, a login screen is displayed asking us to enter our personal data or a password to be able to connect. Pirania is one of these portals, built by the free software community (specifically LibreMesh and LibreRouter activists from Argentina) and designed to control the access to community networks. By using this portal, we can make sure that only people who make monthly contributions to the network have individual passwords that grant them access.

This manual shows how to use the captive portal and also tells the story of how we have collectively addressed the problems we faced in the process. By sharing this experience, we hope to that other community networks can learn about, install, and use Pirania!

Tips to install and use Pirania on a community network

Young people and women took part in the installation process, in which they were able to learn and ask questions about the process as it was happening. The idea here is to make sure the people who actually take care of the network can fully comprehend the processes to maintain and use it.

At this point, it is important to make sure equal conditions are offered to people of any gender, race and age, so that everyone can understand what is being done. During workshops, people who are more familiar with the equipment often learn faster and work on the installation process. This leads to people who are less familiar with this kind of technology – usually girls and older people – to lose track at the workshop and ultimately become too discouraged to learn. This is why we must be mindful of programming the activities, making sure they evolve at a pace that allows everyone to comprehend what is happening. Using a big screen or a computer to show each procedure may be interesting, because, when we use our phones, we are not able to show everyone what is going on.

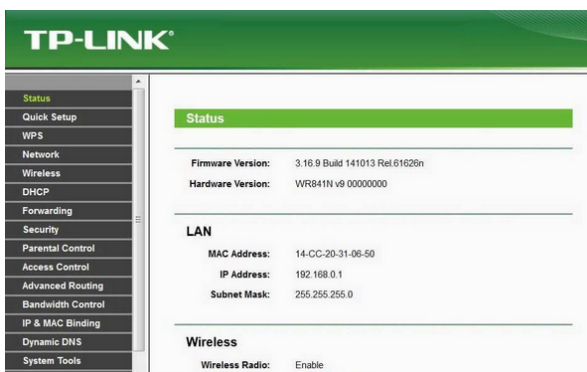# Pirania basic settings on the community network: Generating vouchers

The Pirania Captive Portal is a free software program developed by the LibreMesh and LibreRouter technical developers community; they are respectively a free-software firmware that allows adding mesh networks to common routers and a free hardware router that makes it easier to install community networks.

It is important to underscore some concepts regarding how to use and set up Pirania.

Several community networks have been using LibreMesh[2], a system that changes firmware, which is like a router's or antenna's operating system.
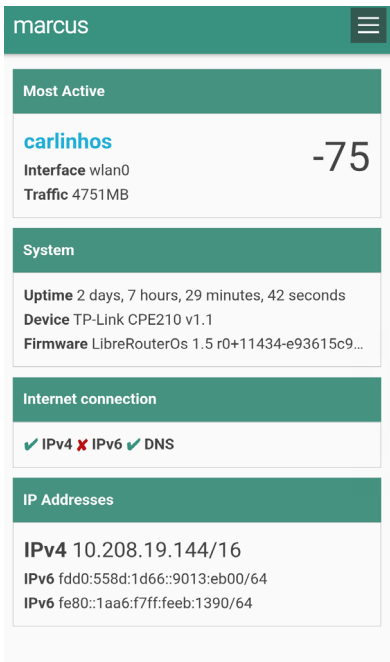

To illustrate better, these are the routers and antennas that the networks use more often when mapping the network in the community.

These routers come with an operating system (firmware) that looks like this.

_____

2   https://libremesh.org/

marcus	☰

Most Active

carlinhos   **-75**
Interface wlan0
Traffic 4751MB

System

Uptime 2 days, 7 hours, 29 minutes, 42 seconds
Device TP-Link CPE210 v1.1
Firmware LibreRouterOs 1.5 r0+11434-e93615c9...

Internet connection

✔ IPv4 ✖ IPv6 ✔ DNS

IP Addresses

IPv4 10.208.19.144/16
IPv6 fdd0:558d:1d66::9013:eb00/64
IPv6 fe80::1aa6:f7ff:feeb:1390/64

And when you change it to LibreMesh, it will look like this.

Switching from proprietary software (which comes with the product from its manufacturer) to free software (LibreMesh)improves equipment performance and provides the network with a mesh topology that makes the network more independent.

It should be noted that the Pirania Captive Portal is installed on antennas in this process of changing their firmware. Creating this new firmware with LibreMesh and Pirania is what the community that created them (both LibreMesh and Pirania) calls "compiling firmware".

Here is a reference link[3] showing how it is compiled.

A huge challenge is that the communities where community networks are installed usually do not have people with advanced computer skills. This is why training them is important before starting this process. Over the course of time, problems and errors may arise that require study in order solve them. This has happened and still happens both with the Portal Sem Porteiras and the Terra Seca networks, even after people have had access to workshops, because some procedures require skills related to the concept of reverse engineering, which is still an unfilled gap in most workshops. This is why we must further think about teaching-learning methodologies for community network processes.

Setting up the Pirania Captive Portal requires these skills and, even though they are introduced in workshops, the final settings are often adjusted by the technical community (people with intermediate/advanced skills related to computer networks and information systems, usually those who help install the networks).

The manual is unfortunately in English. One tip is to use the Google Chrome browser, because you can use it to translate it automatically. If you are having trouble accessing it by clicking the link, just google Compiling Pirania LibreMesh and you will find a website called GitHub, where you can find its documentation.

3   https://github-com.translate.goog/libremesh/lime-packages/blob/73a1cc91b3becb0a0daddd087851d9fcda1e3b36/packages/pirania/Readme.md?_x_tr_sl=auto&_x_tr_tl=pt&_x_tr_hl=pt-BR&_x_tr_pto=wapp

Basic voucher setup when Pirania is already installed on your community network

Once Pirania is installed on your network, you must take the following steps to access the setup panel to generate vouchers.

It should be noted that these settings are presented via a mobile phone, as this is the reality of most communities that use the network. The steps are similar if you are using a computer (a laptop or desktop PC), but there may be differences in the initial process.
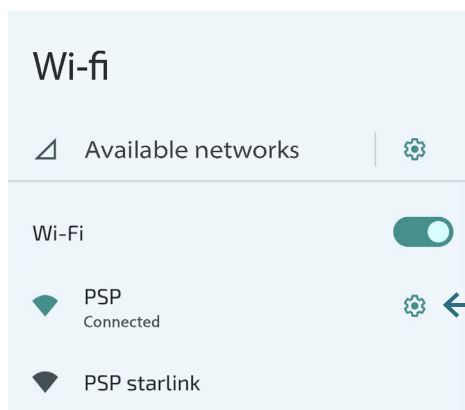

1. Connect to your community network (example, PSP Community Network).
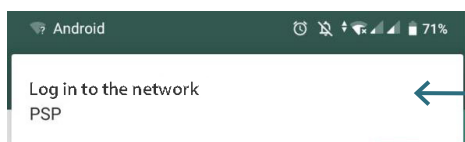
2. After you are connected, a message will appear on the upper corner of your phone with a question mark. Click to go to the setup panel. Alternatively, after connecting, open your phone browser and enter **thisnode.info**.
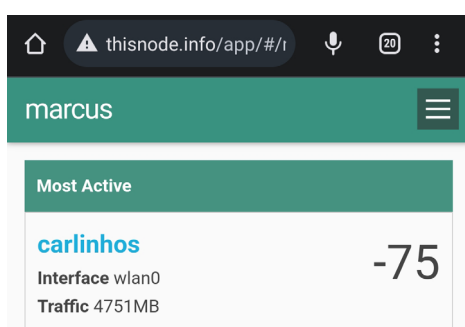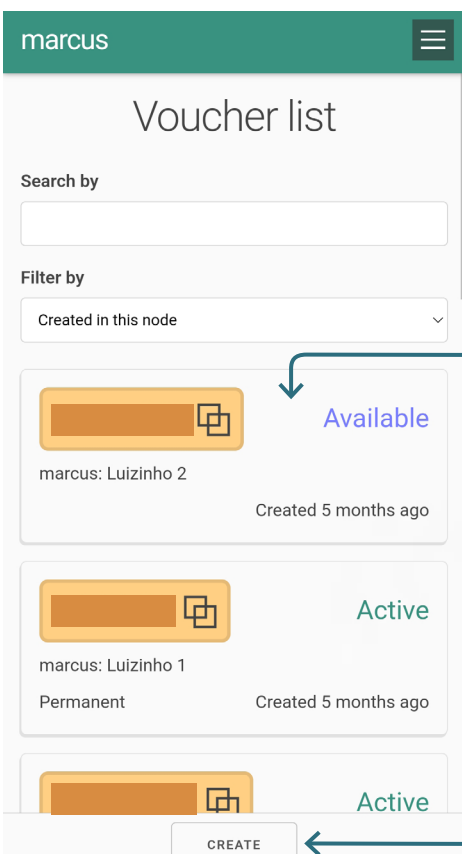

3. The network setup panel will be displayed. Click on the three lines on the right of the screen.
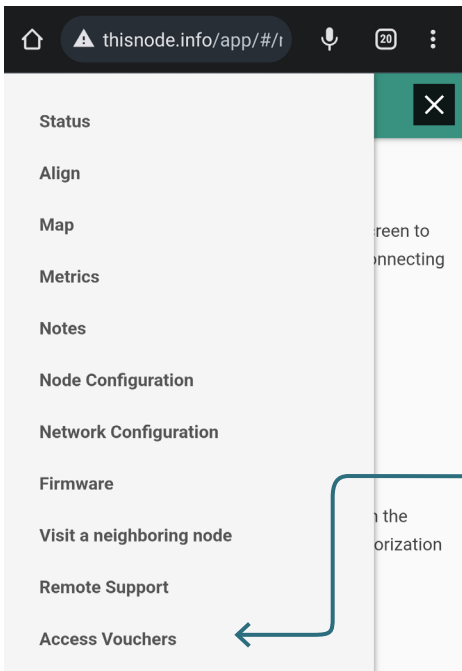
4. Open the drop-down **Menu** and click the option **"*Voucher de Acesso*" (Access Voucher)**.
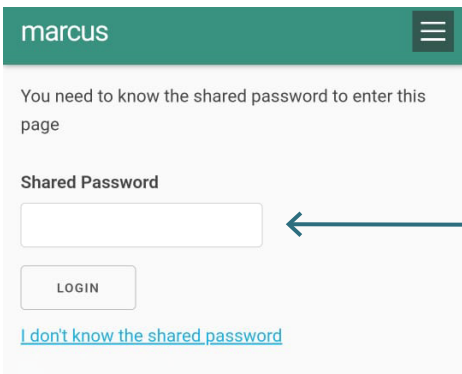
5. You must enter your password to access the setup area. This password is usually generated the first time you access the routers set up with LibreMesh.

6. These screenshots show a network on which we have installed Pirania and assigned vouchers (installed antennas) and, in this case in particular, it features a list of the vouchers that have been created. When setting it up for the first time, this list will not be displayed, so let's go over how to create your first voucher.

7. Go to the option **"*Criar or Gerar*" (Create or Generate)** at the bottom of the page.

marcus ☰

‹ Create Voucher

Voucher group description
Max. 100 characters

[   ]

🟢 Is permanent

Voucher duration in days

[1   ]

Number of vouchers

[1   ]

⚪ Setup activation deadline

Activation deadline

[02/24/2023   ▾]

CREATE

TXULAO ⧉   Available

⌂ 🔺 thisnode.info/portal/a   < ③ ⋮

Portal PSP

Enter a voucher

[   ]

Continue

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8. Some settings are displayed on the ***Criar Voucher* (Creating Voucher)** screen. You can create a permanent or a temporary voucher. It should be up to the community itself to make this decision, but bear in mind that vouchers are usually related to network control and monthly payments to access the internet. In the case of the Terra Seca network community, there are network guardians who hold a permanent voucher, while other users have monthly vouchers. Other temporary vouchers (valid for one day, for example) can also be created for visitors. The setup area allows you to choose the duration of the voucher when the password is temporary.

9. Please note that there is an option to describe to which group each voucher belongs. After deciding what kind of voucher will be selected for that particular node, go to **"*Criar*" (Create)**.
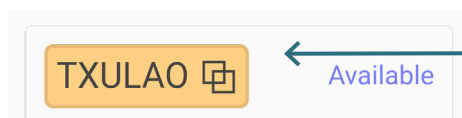
10. You will be redirected to a page showing the list of vouchers that have been generated. Now you just have to copy it.

11. Now connect again to the network via Wi-Fi or a browser on your phone using the address **thisnode.info/portal**.

12. A field will be displayed requiring you to paste your voucher and wait.

Index of /portal/

1. [../](#)
   modified: Thu, 14 Apr 2022 16:09:48 GMT
   directory - 0.15 kbyte

2. [css/](#)
   modified: Thu, 14 Apr 2022 16:09:48 GMT
   directory - 0.07 kbyte

3. [js/](#)
   modified: Thu, 14 Apr 2022 16:09:48 GMT
   directory - 0.07 kbyte

4. [auth.html](#)
   modified: Thu, 14 Apr 2022 16:09:48 GMT
   text/html - 1.22 kbyte

5. [authenticated.html](#)
   modified: Thu, 14 Apr 2022 16:09:48 GMT
   text/html - 0.86 kbyte

6. [fail.html](#)
   modified: Thu, 14 Apr 2022 16:09:48 GMT
   text/html - 1.25 kbyte

7. [info.html](#)
   modified: Thu, 14 Apr 2022 16:09:48 GMT
   text/html - 2.47 kbyte

8. [read_for_access.html](#)
   modified: Thu, 14 Apr 2022 16:09:48 GMT
   text/html - 1.33 kbyte

13. If you are setting up your Captive Portal on your laptop computer, the steps to access the portal are a little different.

14. Connect to a Wi-Fi network with your laptop, open a browser, and enter **thisnode.info/portal**.

15. You will then be redirected to a page where you will have to click on a file called **auth.html**.

16. It will then open the page to enter your voucher.

Pirania Captive Portal

Links

Portal

Enter a voucher

[   ]

[Continue]

17. It should be noted, based on our field experience, that sometimes it takes a while to connect. Wait for a few minutes before checking if something went wrong.
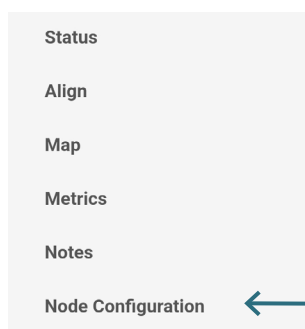
How to activate the Pirania Captive Portal on your mesh network (Lime)

When we install LibreMesh on our routers and antennas, the captive portal appears as an option in the system's setup panel.

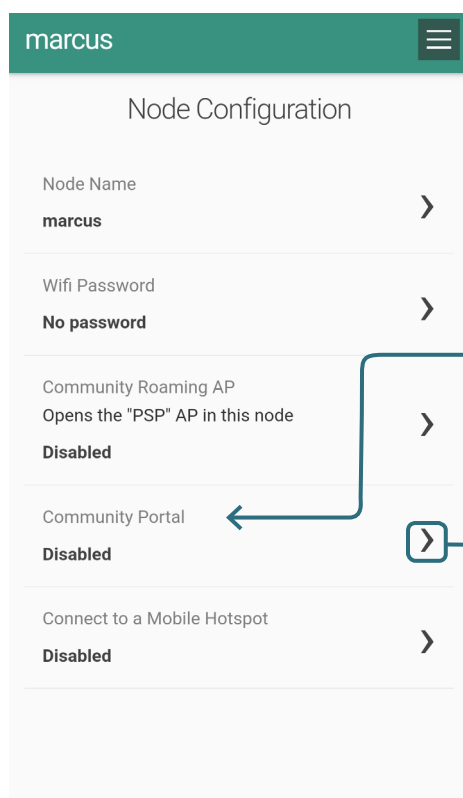Now let's go over how to activate the captive portal on your community network.
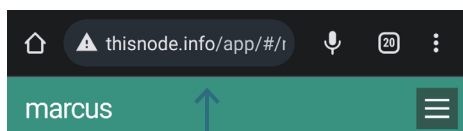
1. Connect again to the Wi-Fi network and enter **thisnode.info** on your browser.

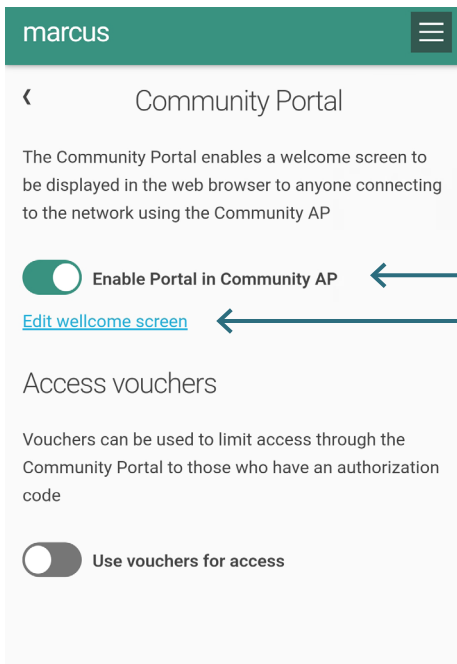2. Then go to the drop-down **Menu**, on the three lines on the right of your screen.

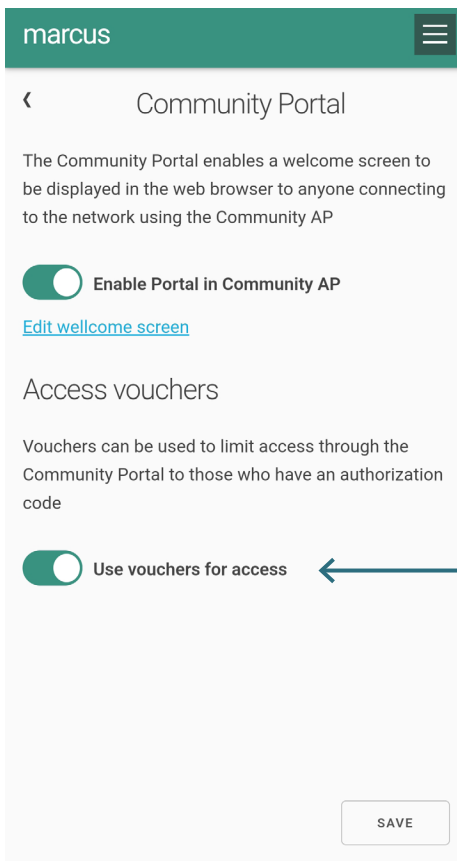3. Then click on **"Configurações do Nó" (Node Settings)**.

4. Enter your user password – it is usually set during the first steps when setting up the LibreMesh system.

5. When the **"Node Settings"** page opens, go to the option **"Portal Comunitário (Community Portal)"** and click on the arrow on the right of your screen.

marcus ☰

‹   Community Portal

The Community Portal enables a welcome screen to be displayed in the web browser to anyone connecting to the network using the Community AP

⬤ **Enable Portal in Community AP**

Edit wellcome screen

Access vouchers

Vouchers can be used to limit access through the Community Portal to those who have an authorization code

◯ **Use vouchers for access**

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6.   A page will then open where you will have to activate the two options:
a) ***"Ativar Portal no AP Comunitário"* (Activate Portal on the Community AP)** which activates the welcome page of your network. The option **"*Editar tela de boas vindas*" (Edit welcome screen)** allows you to write more about your network for your community to see.

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marcus ☰

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The Community Portal enables a welcome screen to be displayed in the web browser to anyone connecting to the network using the Community AP

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Edit wellcome screen

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⬤ **Use vouchers for access**

SAVE

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7.   You will also have to activate the option **"*Use vouchers de Acesso*" (Use Access Voucher)**, which will create a voucher option for your network, as described step-by-step above.

8.   **There you have it: the captive portal is now activated on your network.**

Deactivating a voucher on the network

Now that we have learned how to create a voucher, let's go over how to deactivate it if necessary. This may be necessary when someone no longer belongs to the network or when payments are delayed. However, we suggest that before cancelling someone's voucher, talk to them to understand why they were not able to pay the monthly fee. You could discuss ways to deal with the situation, so that removing them from the network is a last resort.
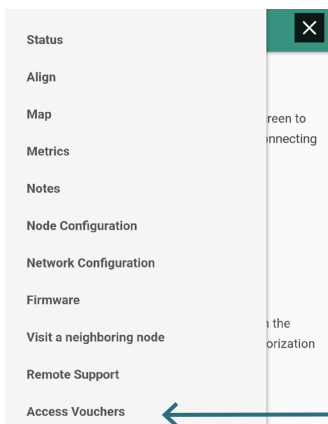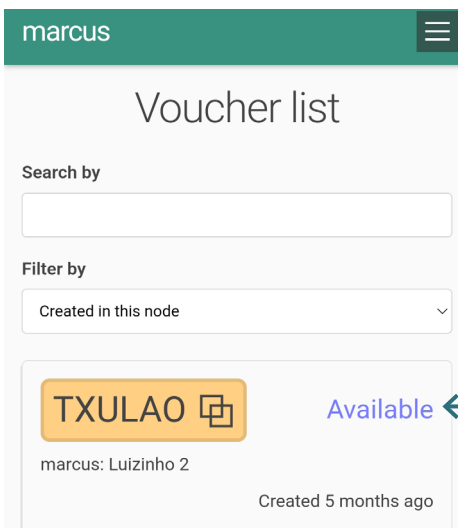
1. Connect to the network through a browser and type again the address **thisnode.info**. That same setup panel we used to create the vouchers will open.
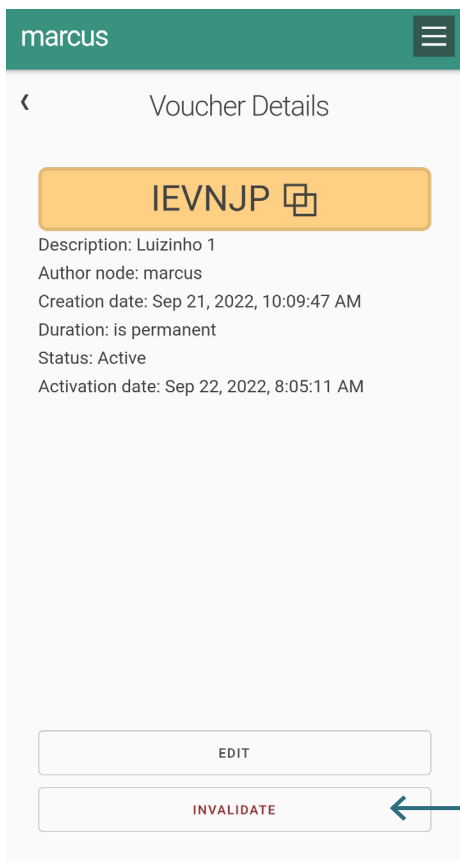
2. Click on the drop-down **Menu** and go to **"Vouchers de Acesso" (Access Vouchers)** again.
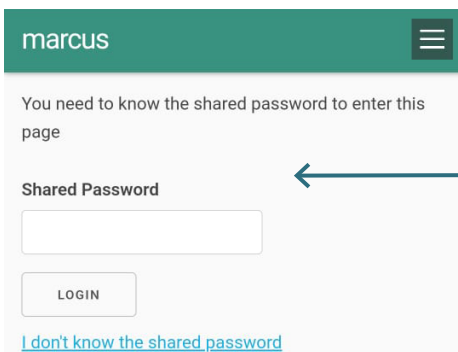
3. After you click on **Access Vouchers**, it will ask you to enter the password set on the antenna.

4. Click on the available voucher you would like to deactivate.

marcus ☰

‹   Voucher Details

IEVNJP ⧉

Description: Luizinho 1
Author node: marcus
Creation date: Sep 21, 2022, 10:09:47 AM
Duration: is permanent
Status: Active
Activation date: Sep 22, 2022, 8:05:11 AM

EDIT

INVALIDATE ⟵

5.   A page will be displayed with **"Detalhes do Voucher" (Voucher Details)**. Click on the option ***Invalidar* (Deactivate)**.

6.   Please note that there is no option to remove a voucher – you can deactivate someone's access or antenna or change a voucher for a common Wi-Fi password.

Removing the Pirania Captive Portal from the network

At some point, for some reason, it may be necessary to remove Pirania from the network, leaving only a connection with a common password. Here is how:
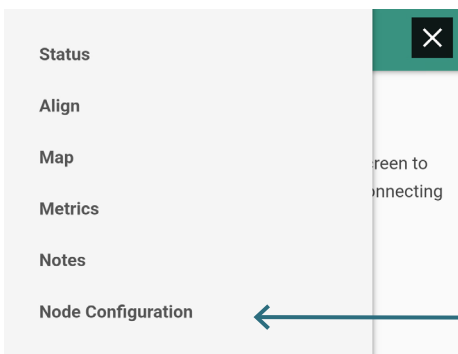
1. Connect to the network and access the setup panel on your browser. Go to the option **"Configuração do Nó" (Node Settings)**.
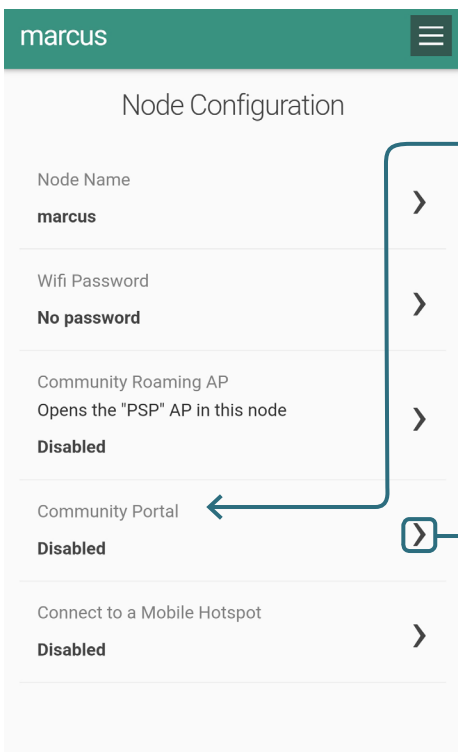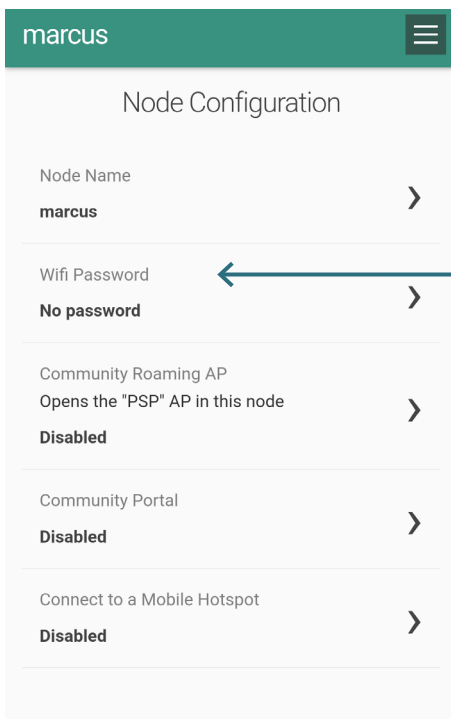

2. Enter the password to access your antenna, then go to the option **"Portal Comunitário (Ativo com Voucher)" [Community Portal (Activated with Voucher)]**.

marcus ≡

‹ Community Portal

The Community Portal enables a welcome screen to be displayed in the web browser to anyone connecting to the network using the Community AP

● Enable Portal in Community AP

Edit wellcome screen

Access vouchers

Vouchers can be used to limit access through the Community Portal to those who have an authorization code

○ Use vouchers for access

3. On the setup panel **"Portal Comunitário" (Community Portal)**, deactivate the option **"Use vouchers de Acesso" (Use Access Voucher)**.

4. There you have it! Now your network no longer requires access vouchers. It is important to set a common access password afterwards, if necessary.

marcus ≡

Node Configuration

Node Name
marcus ›

Wifi Password
No password ›

Community Roaming AP
Opens the "PSP" AP in this node
Disabled ›

Community Portal
Disabled ›

Connect to a Mobile Hotspot
Disabled ›

5. To set a common password, go to **"Configurações do Nó" (Node Settings)** and then **"Senha Wi-Fi" (Wi-Fi Password)**.

6. Note that you might need this option to create a password in the case a local commerce needs to connect the network into a credit or debit card terminals.