

# "WIRELESS NETWORK ACCESS FOR ZONE CENTER CITY IBARRA"

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**Summary.** *This work was done a design for a wireless network using WiFi technology in the downtown area of the city of Ibarra. This paper is divided into 5 chapters we take q to have the desired pattern*

*The purpose for which this project is done is to integrate Information and Communication Technologies in the city as it indicates the NDP Communications driven by the national government and improve the quality of life of the inhabitants of the city, and that with this project we will be taking advantage of the fiber optic rings that are in the city of Ibarra.*

## Keywords

Integrate, Technology, Information, Development, Communications.

## Introduction

The first chapter will include all the necessary theoretical background on technologies and terms to be used in the design.

In the second chapter a survey of geographical information which is included all studies of the coverage area in order to have the necessary information to help you get started with our design will be performed.

Once the geographic information, start with the planning of the network where the nodes and the necessary equipment to the design is properly made will detail the location of the same is also detailing.

With the data obtained in the previous chapters and we can design our network and will be detailed

network topology, coverage areas and services necessary to give a proper use of our network.

Finally there will be a cost benefit to our project and configuration manuals, users and all required attachments which could support this project included analysis.

## Materials and methods

This project is focused throughout the downtown area of the city of Ibarra whose scope will be limited by the streets:

- Sanchez and Cifuentes
- García Moreno
- Vicente Rocafuerte
- Christopher Columbus

Gathering information on the current situation of the city in our coverage area will be conducted to determine physical obstacles that may cause interference to the network, in addition to information for users who will have access to this network using field observation the average number of users who will in certain sectors of our coverage area for a week taking into account the days Monday, Tuesday, Wednesday, Thursday, Friday and schedules from

8h00 to 10h00, 12h00 to 14h00 and 17h00 will tell 18h00.

Nodes that will be needed to cover the entire area with the use of Access Point analyzing quipos brands from different suppliers with characteristics that meet the requirements of our network is determined, taking into account that these should integrate the three fiber rings covering all this area and also should see all the equipment needed to interconnect this network dare ring fiber.

With the above information we will proceed to network design that meets the requirements of coverage and access to users in the specified area without problems or cut off area, for which a study of hand-off that reduces these problems will manner that is imperceptible the association from one AP to another user.

To provide administration to the network will use a solution under a free software that allows us to control the session time users, this would be done with the use of a captive portal which will be configured according to the needs identified in the process of gathering information also need to install a server that allows us to perform MAC address authentication, ensure that we have a good management of our access points.

Will also analyze the services and propose appropriate access policies for users who use the network, is also necessary to establish restrictions on access to the Internet will do this with the use of a Firewall Proxy.

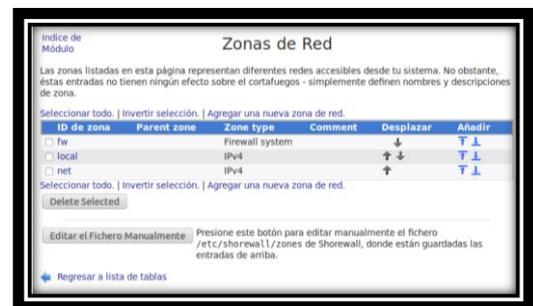
Market research and equipment features that are available in the market in order to make a detailed list of the most suitable equipment for these can be acquired through the public procurement process was performed.

With the development of our design we will be testing the access policies on a test server.

Necessary conclusions and recommendations and an analysis of the lessons learned during the project will be conducted.

## 1. Results

To begin, we must set our Shorewall Firewall, for this we define three areas: our local area, a net, and our area firewall, in addition to associating with network interfaces by which they are connected.

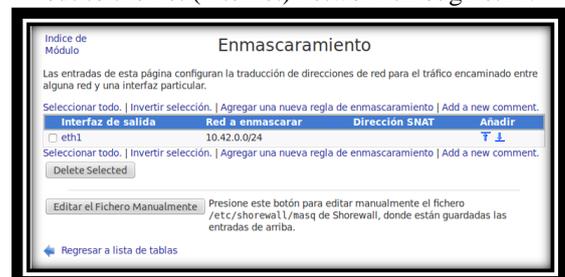


Red zones



Network Interfaces

It is also important to do in masking our local network out to the net (internet) network through eth1.



Masking

Once the interfaces defined areas and give the default policies which deny traffic by default and firewall rules, these rules will not be many as we need the following:

- Deny traffic to the local network to the proxy firewall on port Webmin to avoid connections that allow entry to the configuration of our firewall or n.
- Redirect all traffic to our local network to port 3128 which is the port that works our proxy for our proxy is transparent.
- Traffic to allow the local network to the internet.
- Traffic to allow the area to anywhere firewall.
- Traffic to deny the internet firewall to our area and crazy.
- Leave a range of IPs Administrator permissions for remote configuration or n.

transparently, we create the following rules to reject requests from our web users, proxy rules are the following:

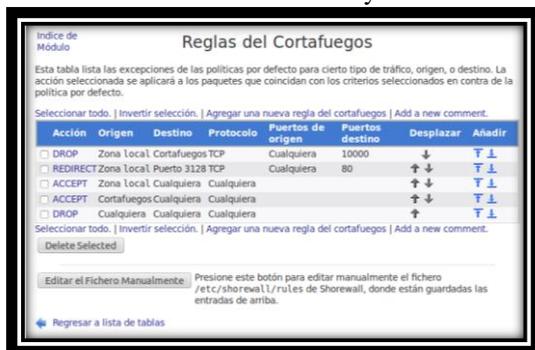
- Port to ban all pages with sexual content.
- Prohibit large pages to prevent traffic to data such as YouTube and Facebook.
- Prohibit the discharge of music and videos.
- Leave a range of IPs Administrator permissions for remote configuration or n.



Ports and Network

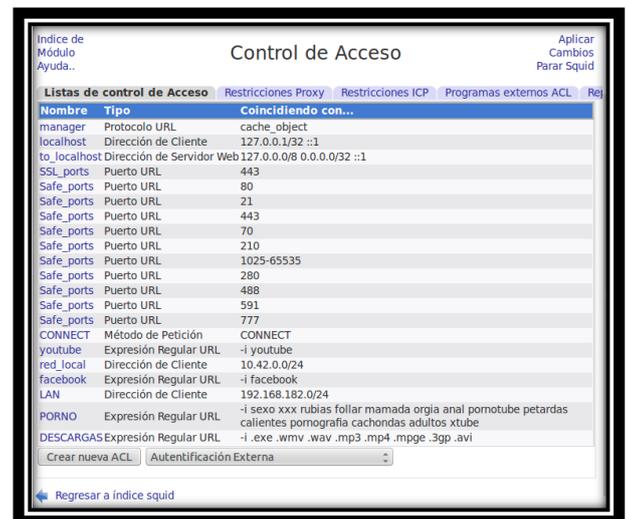


Default Policy.



Firewall Rules

- After having our Shorewall Firewall up and running configure this proxy, it is important to define the working port is 3128 and works



Access Control Lists



Proxy Restrictions

Once our server configured and running Proxy Firewall configured our captive portal, it is essential that we allow our Captive Portal authentication for users who can access the Internet and must be allowed free access to government sites such as the IRS, the GAD of San Miguel de Ibarra The Provincial Government, etc.

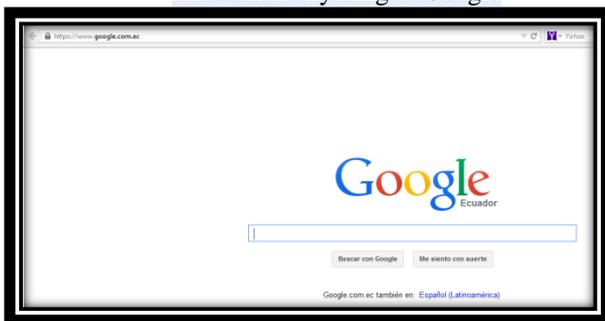
1.1 TESTS

In this section we define tests to guarantee the correct functioning of our network, we will do this by testing each server and checking that the rules we have defined work properly

- Firewall Connectivity Tests Proxy.- this test is to verify that the output has Proxy Firewall Internet to check this by performing ping the server and get into google this product trav é s web browser.



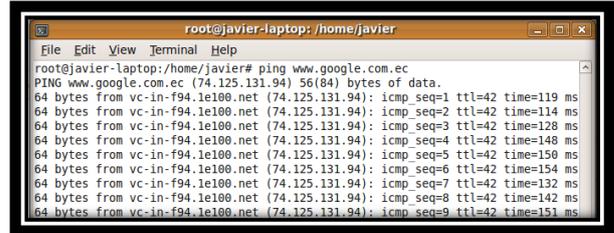
Firewall Proxy Ping to Google



Proxy Firewall from Google

On this test we can see that our Firewall Proxy is an Internet connection and functioning rule Shorewall firewall that allows us to have access to everything.

- Connectivity Testing of the Portal Cautivo.- this test will make a ping from the Captive Portal and we walked up to Google's web browser to Google.



Ping to Google Captive Portal



Ping to Google Captive Portal

With this test we check that our Captive Portal has access to the Internet and also tells us that the firewall is properly performing the nateo and masking.

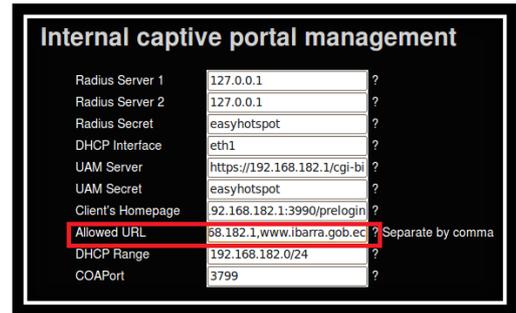
- No connection or the USER.- in this test will connect to any user in this case we use a user in Windows XP and verify from the console with the ipconfig / all command our IP and our DNS server.



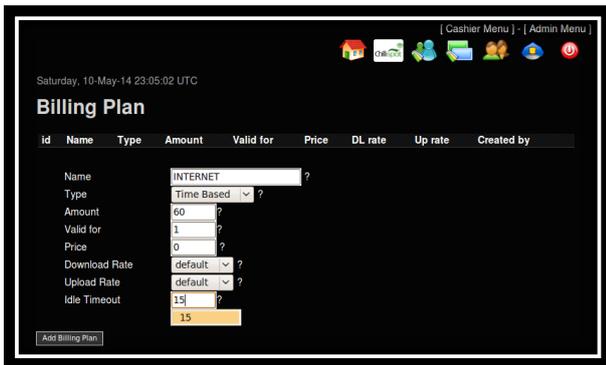
Viewing dl command ipconfig / all from a user XP

With this test we can see that we assign the ip 192.168.182.2/24 and gateway 192.168.182.1 this indicates that the DHCP server of our Captive Portal works well we can see how chillispot.info.key DNS suffix is the suffix DNS Captive Portal, also indicates that we are connected to our Captive Portal.

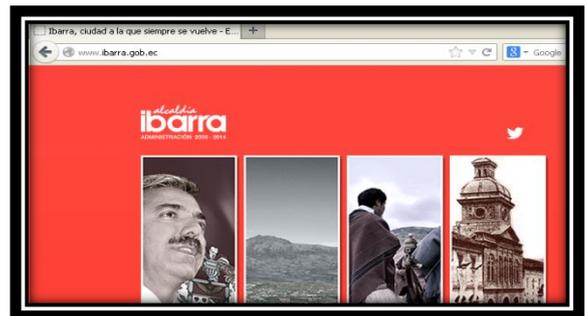
- N of generation or create an account USER.- duration of an hour and generate a user from the Captive Portal.



Allow access to [www.ibarra.gob.ec](http://www.ibarra.gob.ec)



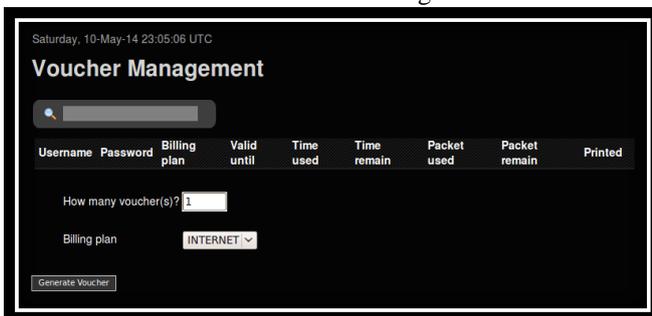
Account settings



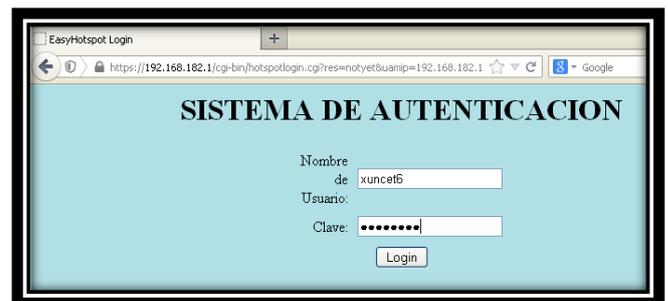
Allow access to [www.ibarra.gob.ec](http://www.ibarra.gob.ec)

As we can see in this test enters [www.ibarra.gob.ec](http://www.ibarra.gob.ec) without authenticating.

- Authentication or n USER.- try to enter duty to google and we ask for a username and password ñ a, will enter the previously generated.



parameters to generate user

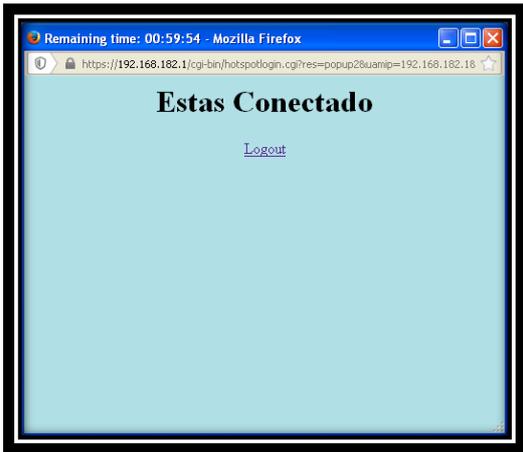


User Authentication screen



Usuario Creado

- Join to Content without authentication or n.- we have to allow access to government ap pages such as the GAD San Miguel de Ibarra, to allow this configuration ion in the Captive Portal to access [www.ibarra.gob.ec](http://www.ibarra.gob.ec) p is the official page and will try to input from the user XP.



Logon Screen

With this test we can see that it's authentication system our Captive Portal works and as we see in Figure 4.26 we have a counter that tells us that we have an hour connection which also verified that the captive portal is controlling us session So we set up earlier.

- Join the Internet USER.- in this test will enter www.google.com to check that ones that have started or sesi n have internet access.



User access Google from XP

It gives us access to the Internet and with this rule Shorewall that allows local network access to internet is also checked.

- Test Proxy.- rules in this test, the following rules will be verified Proxy:
- P to ban all pages with sexual content.
- Prohibit large pages to p tr fico to data such as YouTube and Facebook.



Access has sexual content



access Youtube



Access to Facebook

As you can see from the pictures Proxy Firewall rules work and were denied access and can also see that our proxy works transparently conclusion proxy rules and configuration of Shorewall for it to work transparently works.

- Deny tr fico to the local network to the proxy firewall on port Webmin to avoid connections that allow entry to the configuration of our firewall or n.



### Access Webmin from user XP

No Firewall allows access to the proxy server through Webmin.

- Weekends Sesi n.- or after the time the session ended or n expire.



### Screen Adjourn

## 2. After the meeting a sale shows the message

## 3. Conclusions

- It is very important to perform proper information gathering for this miss our design appropriately.
- The use of Free Software opens a number of doors in order to solve problems, as in this work free software gives us a variety of resources to work together to give us the best service.
- Such projects help to improve the quality of life of the inhabitants of a city and be directed towards a technological world.
- Dissemination of Information and Communication Technologies is very positive for the people, because it leads to be communicated and reported every day.

- When using fiber optics as the transmission medium to have a great time riding services on our network advantage, since the bandwidth and the speed with which we work are very high.

- Using a Shorewall Firewall is very important in the design of a network, this provides a very high security while not as complex as are other Firewalls also can be mounted on any Linux based server.

- Squid Proxy is an effective tool in restricting web content, it is always important to restrict this type of content is open networks.

- Use EasyHotSpot as our Captive Portal is a fast and efficient way to service authentication and bandwidth control to our users.

- It is very important to a correct configuration of APs because these are what allow us access to our network.

## Thanks

Mainly thank God for life, health and opportunities that I have to do everything that I propose, honoring and putting the almighty above all things.

My sincere thanks to the Technical University of the North and all my teachers in general for giving their knowledge and support, Ing. Michilena by Jaime effort, patience and demonstrated throughout the process and dedication to forge me theoretical knowledge and values human that will help me throughout life,

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