SYSTEM TO DISPLAY INFORMATION AND LOCATION OF ALL SCHOOLS AND EDUCATION IN THE CITY OF LOJA

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Abstract

In this paper we talk about the development of a web application aimed at the educational institutions of the province of Loja. There are currently applications with some similarity to the project but we have tried to give more functionality integrating different modules that cater to certain needs by users.

It has been used different tools such as a database manager to upload the information, MySQL Workbench to model the data, text editor such as Sublime Text , etc.

The protocols used for sending information are HTTP, TCP / IP, also the flow of data is explained from the very first moment when the user makes a request to the server to get results.

Has been used layered architecture because the application is focused on social sphere and consultations that take place are constants. An encryption method called MD5 password for greater application security was implemented.

To make the application available to different users you have purchased a domain and a host (BIZ.NF) and that the project has been uploaded to the availability of the persons concerned.

Key words: OSI; HTTP; TCP/IP;MySql Worbech; Domain; Host; IP ; UTPL ; BDD

1 Introduction

Currently to get information from the institutions we are forced to turn to the institution, search secretariat and ask about any concerns, this forces us to have time. On the other hand there are web sites that already have information on educational institutions, but with very limited information and no interactive user, and in many of the cases outdated.

In this situation, The proposed application solves the lack of structured and joint of all existing schools in the city of Loja such as early childhood education, schools, colleges, technical institutes, universities and academies.

On the other hand the Ministry of Education and the national information system through their web portals provide information on educational institutions but in a format that users not called attention (.xlsx). That is why we propose an application where you can view the exact location of the centers through the Google Maps API and publicize information theFallas institutions through charts (pie, bars).

One of the biggest problems is to update the current information, which is why the application has accounts for each institution to be themselves those in charge to manage your information and a possible change to the can update immediately.

To end the introduction we can say that the application is available for the general public who have access to Internet, as it is uploaded to a server in the cloud, on the other hand it is also important to understand that complete information is vital to keep the public informed, something that some applications do not have.

2 Related Projects

Locally and nationally there are some websites that provide information about educational institutions that exist in the city of Loja.

There are applications that display some educational institutions (Portal del Colegio (Colegio, 2010)) (Top Colegios (Colegios, 2012)) (Centros Educativos de la

Table 1
Tools Used

Name	Description
Django	Framework for the development
PostgreSql	database manager
Mysql Worbench	modeling database
Google Maps	API of Google
Highcharts	API statistics (pie chart)(bar graph)
HTML5	Application Design
CSS	Styles for the application
GitLab	For versions
SublimeText	Coding
Phppgadmin	Database Manager

Ciudad de Loja(Colegio, 2010)) and the same as disclosed only the name of the institution and address and in many cases this information is out of date. Another situation is an application that uses the Google Maps API but does not work well as it shows the same direction at all centers (Tiching (Tiching, 2011)). Also at the local level there is a web page that displays structured information about some colleges but is not complete (Cursos y Carreras (Carreras, 2014)). On the website of the "Sistema Nacional de Información" through an application displays information for all educational institutions of Loja and is visible through a map but only displays information such as location and coordinates educational institutions but lacks more information related to such institutions (Sistema Nacional de Información (Información, 2015)).

The draft submitted that unlike those mentioned above, the application displays complete information that has been extracted from the INEC, SNI and the ministry of education, and has worked with the API of Google Maps showing the location of a personalized way for each institution, the API Highcharts serving exclusively for present graphical statistics on institutions is also used. The application has a search engine to allow the user to easily access the institution you want. All these aspects make the application filed is unlike other integration of different functionalities that favors users.

The information will be updated for each user, and each user has an identifier to register and so may keep your update information

3 theoretical framework

3.1 Tools Used

For application development tools is used based on performance (Python, PostgreSQL). The management of each of the tools is focused on different areas, namely, data structuring tools were used: PhpPGAdmin, PostgreSQL, MySQL Worckbench. HTML5 and CSS, for Git project versions Lab was used, etc.

3.2 Statistical data on institutions

The number of educational institutions in the city of Loja is higher in Fiscal centers and even in schools with a total of 176 institutions.

Table 2
Number of educational institutions

Type of Institution	Category	Number of Centers
Initial	Fiscal	28
Initial	Fiscomisional	2
Initial	Particular Secular	13
School	Fiscal	176
School	Fiscomisional	2
School	Municipal	3
School	Particular Secupar	18
school	Particular religious	2
High-school	Fiscal	32
High-school	Fiscomisional	12
High-school	Municipal	5
High-school	Particular Secular	15
High-school	Particular religious	6

As presented in the above table, the schools in the city of Loja are dominated by schools, so that users web application that prevail are the school administrators.

The number of institutions categorized by the type of institution is presented in Table 3.

The information for each institution is hosted on the server and available to the public.

3.3 Protocols

The protocols used for the application are: TCP (Transmission Control Protocol), IP (Internet Protocol),

Table 3
Number of institutions by type

Type of Institution	Number of Centers
Garden	43
School	201
Preparatory	70
College	1
Technnologic Institute	1
Language Schools	4
Music Schools	4
Sports Academies	1
Special education	2
Rehabilitation Centers	2
Hearing and Speech Centres	1
Artisan training centers	1

HTTP (Hypertext Transfer Protocol).

The TCP / IP protocol for transferring data between different nodes. (Yoon, 2009)

The data are sent by the application to the network, run through the stack TCP / IP protocol from the uppermost layer of the application to the lowest which is the access to the network. When received, the protocol stack walking in the opposite direction. (Philippe ATELIN, 2014)

As to the HTTP protocol, the WWW (World Wide Web) exchange of information should be given by the protocol because it enables communication between client / server and operation is based on simple request / response is needed. (Li, 2013)

3.4 Securyty

When a Web application user accounts can be handled easy for intruders to find fault through them and perform various damages to the application and that is why you should use the MD5 algorithm.
It is an algorithm that transforms the data to a level that is almost impossible to access, that is, gives us data integrity. The MD5 algorithm is represented as a 32-digit hexadecimal number, this identifier is called hash. An example of encryption in an empty field would be:
MD5 ("") = d41d8cd98f00b204e9800998ecf8427eg

3.5 Data flow in network

Here we will explain how communication between our client and our application server is via TCP / IP and what happens in each of its layers Protocol.
Network Access:
By clicking on a link (website) started a flow of information inside the computer and this information travels to the personal messaging where the IP packages it, labels and sets off. Each packet is limited in its size local courier must decide how to divide the information and how to package it. Each package requires a label describing important information such as: The address of the sender (client-server), the recipient (Client-Server) and the packet type is and because this online travel package also receive a label for the proxy server. At this point the data leaves your machine and go towards our corporate wired network, the packet is sent to the local area network (LAN). The LAN is nothing controlled and found various types of packages. The local router reads the addresses of the packets and if necessary puts packets on another network. The router is the symbol of control between a network without it. When the packet leaves the router go their way through the corporate network or intranet.

Later we find the switch router losing packets deftly routing path for its resemblance to a pinball.

When the packets arrive at their destination are collected by the network interface to be sent to the next level in this case the proxy The proxy is used as an intermediary with the function of establishing and shared among multiple users with a single Internet connection and for security reasons. The proxy opens the packet and looks for the web address or url and depending on whether the address is acceptable package will be sent to the Internet. (In case there are addresses that do not have the approval of the proxy according as it has been configured according to corporate policies or administrative and such directions are immediately destroyed.) After our package was received by proxy, you must return to the path within our LAN. The next step is to cross the local corporate firewall or used to prevent unwanted intrusions from the Internet and prevents sensitive information of our company is sent to the Internet, once it passes the firewall passes a router collects every packet and places in a bandwidth (if a package has failed to go all, when the IP protocol does not get a notification that the packet was received in due time simply sends a replacement packet) and are ready to move to the next protocol layer.

Internet

Here we find a web of interconnected networks that all the routers and switches orb extends establish links between networks.

The Routes or paths that packets can take are: satellite telephone wires or transoceanic cables and do not always

take the shortest but always reach their destination (client-server) way.

Nearly reaching the end of our trip and found the computer or server where the website is hosted requested find another firewall. The firewall is designed to let those packets that meet the selection criterion and that the firewall has open ports 80 and 25 which are the doors and all attempts at other ports will be canceled. Port 25 is used for mail packets , while port 80 is the entrance for packets from the Internet to the web server.

Transport

Inside the firewall packets are filtered more rigorously and for packages that were not doubtful , go to the interface to be taken to the Web server, one by one the packets are received , opened and unpacked. The information contained in (our request for information) is sent to the Web server application .

Application

The packet itself is recycled , ready to be used again and filled with the requested information, labeled and shipped back to us . Returns by the firewall web server and router throughout Internet , back to our corporate or local firewall and up our interface into our computer , here is the web browser provided with the requested information.

4 Methodology

4.1 Design

4.1.1 Flowchart

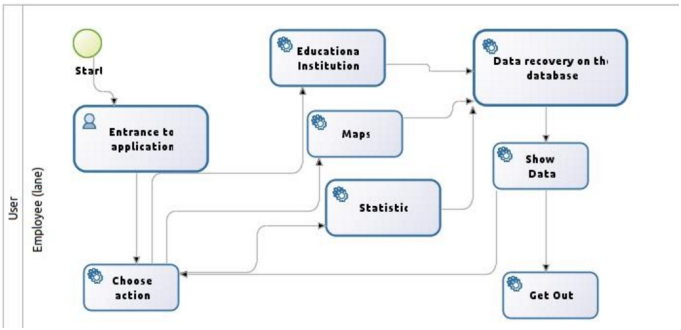

Fig. 1. Flow application data

In Figure **Figure 1** the application flow for people who access the website shown . First the user must enter the website , once you have entered must choose the search criteria of educational institutions , as it has different criteria and finally to display the information .

If the user is a client application (Institution Manager) will have the privilege to manage information such as data update .

4.1.2 Database

To implement the system modeling it was held in the MySQL Workbench tool, which involves information from different educational institutions of the city of Loja. The information includes the web application is around the educational centers , among them are:

Type of educational institution, such as : Universities , Schools , Colleges, Academies (English , Football , etc.) , research institutes and others.

Depending on the type of center that is different information is handled such areas and universities have to offer each race and the availability of forms.

In addition it provides information on the status of the school as public institution , private , etc. All this information is structured as shown in **Figure 2**, that is, each table is related to each other to provide a compact data structure with respect to schools .

4.1.3 Application

Once you obtained the model we worked with HTML (Hypertext Markup Language) for the corresponding

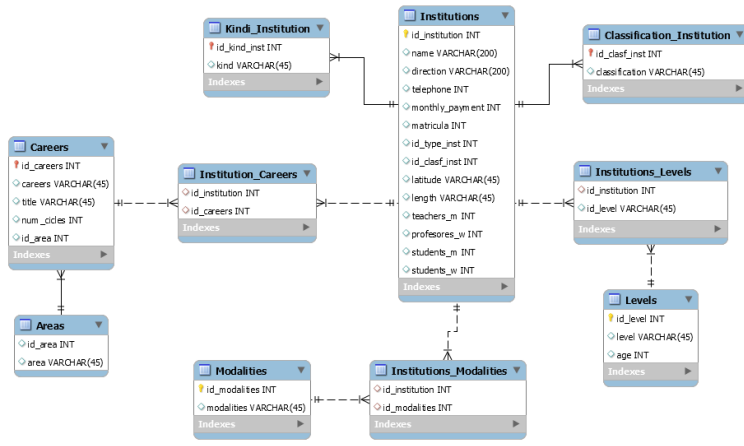

Fig. 2. Database model .

page layout with CSS (Cascading Style Sheets) to get a better format and presentation of the application. The programming language with which we worked was python , using the Django framework .

For the design of the application architecture it worked with Client - Server because the application is focused on the social sphere and this architecture gives us the flexibility and usability is needed.

Because it operates directly with the database is implemented security encryption passwords to not be a victim of an attack by external agents. The encryption method used is MD5.

Furthermore the layered architecture used was (**Figure 3**) for better response between the client and the server.

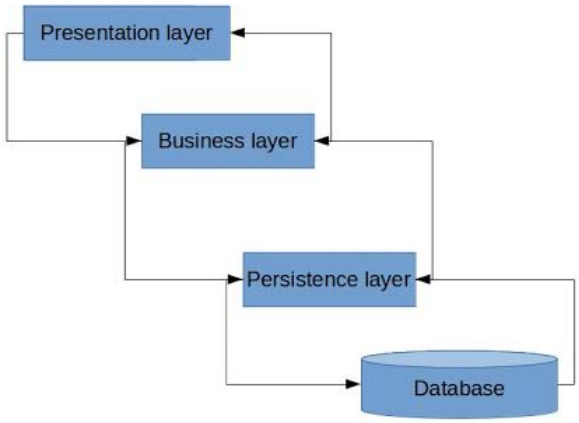

Fig. 3. Layered architecture .

4.2 Layered Architecture

The architecture has decided to use for our project is layered architecture because other architectures are not suited to the needs that are looking at having some problems such as inconsistency of data exchanged between the client and the server .

It is important to note that in addition to the layered architecture client- server architecture is reflected , it is not mandatory that the client and server reside on the same machine ; in practice , it is quite common to place the server in a certain location within a local area network and customers in the remaining locations . (Thomas, 2014).

In the proposed project the customer are all entities such as schools, colleges, universities , etc. as direct user interacting with the system as through a web browser access the system for information management on the portal , and likewise any user to interact with the page. The role of the server is done by our host (http://www.biz.nf) where all the information has been gathered detailed information that banks have risen staying .

5 Results

5.1 Database

The database is modeled using SQL language tables are created and data is inserted , resulting in the script of the database that was implemented in the PhpPGAdmin program (**Figure 4**) then to upload to host.

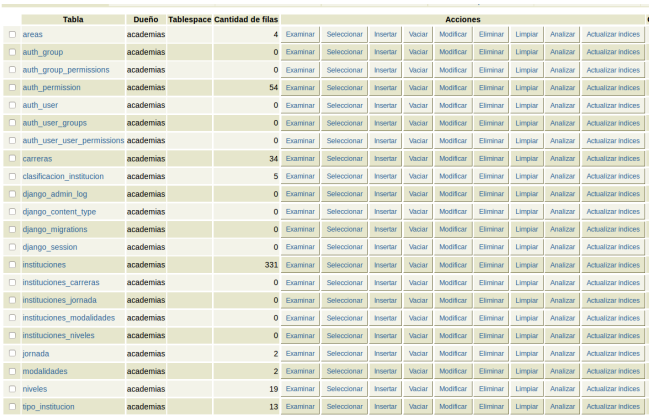

Tabla	Dueño	Tablespace	Cantidad de filas	Acciones
areas	academias		4	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
auth_group	academias		0	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
auth_group_permissions	academias		0	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
auth_permission	academias		54	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
auth_user	academias		0	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
auth_user_groups	academias		0	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
auth_user_user_permissions	academias		0	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
carreras	academias		34	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
clasificacion_institucion	academias		5	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
django_admin_log	academias		0	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
django_content_type	academias		0	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
django_migrations	academias		0	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
django_session	academias		0	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
instituciones	academias		331	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
instituciones_carreras	academias		0	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
instituciones_jornada	academias		0	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
instituciones_modalidades	academias		0	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
instituciones_niveles	academias		0	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
jornada	academias		2	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
modalidades	academias		2	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
niveles	academias		19	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices
tipo_institucion	academias		13	Examinar Seleccionar Insertar Vaciar Modificar Eliminar Limpiar Analizar Actualizar indices

Fig. 4. Structured Data Base .

5.2 Programming

In terms of programming was developed in python with django framework and lines of code were developed with the sublime text editor text ,(**Figure 5**).

On the other hand there is a need for the web application can be viewed from any device and it was necessary to insert the js library. (**Figure 6**) ,the same that allows all existing tags html in the web application to be consumed from any device with network access .

As for page formated the Bootstrap framework was used ((**Figure 7**)) which it is useful help to design web

```
models.py

class Instituciones(models.Model):
    id_institucion = models.IntegerField(primary_key=True)
    nombre = models.CharField(max_length=200, blank=True)
    direccion = models.CharField(max_length=250, blank=True)
    telefono = models.IntegerField(blank=True, null=True)
    mensualidad = models.DecimalField(max_digits=65535, decimal_places=65535, blank=True, null=True)
    matricula = models.DecimalField(max_digits=65535, decimal_places=65535, blank=True, null=True)
    id_tipo_institucion = models.ForeignKey('TipoInstitucion', db_column='id_tipo_institucion', blank=True,
    id_clasificacion_institucion = models.ForeignKey(ClasificacionInstitucion, db_column='id_clasificacion_
    latitud = models.CharField(max_length=20, blank=True)
    longitud = models.CharField(max_length=20, blank=True)
    usuario = models.CharField(max_length=50, blank=True)
    pass_field = models.CharField(db_column='pass', max_length=50, blank=True)  # Field renamed because it
    pagina_web = models.CharField(max_length=100, blank=True)
    cant_profesores_m = models.IntegerField(blank=True, null=True)
    cant_profesores_f = models.IntegerField(blank=True, null=True)
    cant_alumnos_m = models.IntegerField(blank=True, null=True)
    cant_alumnos_f = models.IntegerField(blank=True, null=True)

    class Meta:
        managed = False
        db_table = 'instituciones'


class InstitucionesCarreras(models.Model):
    id_institucion = models.ForeignKey(Instituciones, db_column='id_institucion', blank=True, null=True)
    id_carrera = models.ForeignKey(Carreras, db_column='id_carrera', blank=True, null=True)

    class Meta:
        managed = False
        db_table = 'instituciones_carreras'


class InstitucionesJornada(models.Model):
```

Fig. 5. Django Code.

Nombre	Fecha de modifica...	Tipo	Tamaño
.DS_Store	18/11/2015 0:08	Archivo DS_STORE	7 KB
modernizr.custom.js	18/11/2015 0:08	Archivo JavaScript	9 KB

Fig. 6. Jsn Library .

Nombre	Fecha de modifica...	Tipo	Tamaño
bootstrap	18/11/2015 0:18	Carpeta de archivos	
book.css	18/11/2015 0:08	Documento de ho...	10 KB
demo.css	18/11/2015 0:08	Documento de ho...	4 KB
normalize.css	18/11/2015 0:08	Documento de ho...	2 KB
reset.css	18/11/2015 0:08	Documento de ho...	1 KB
style.css	18/11/2015 0:08	Documento de ho...	2 KB
styleIE.css	18/11/2015 0:08	Documento de ho...	1 KB

Fig. 7. Bootstrap and CSS Files .

applications, together with the language of html and css labeling , designing the final page was obtained.

Finally to display the locations of schools and academies google api was used((**Figure 8**)), which was inserted through a script in a file , the function of the map and the location coordinates (previously retrieved from the database) .

```
<script src="https://maps.googleapis.com/maps/api/js?v=3.exp"></script>
<script >
    function initialize() {
  var myLatlng = new google.maps.LatLng(-4.033556, -79.202718);
  var mapOptions = {
    zoom: 12,
    center: myLatlng
  }
  var map = new google.maps.Map(document.getElementById('map-canvas'),
      mapOptions);

  {% for lugar in instituciones %}
    var marcador = new google.maps.LatLng({{lugar.latitud}}, {{lugar.
        longitud}});
    var marker = new google.maps.Marker({
          position: marcador,
          map: map,
          title: '{{lugar.nombre}}'
      });
      google.maps.event.addListener(marker, 'click', function(){
            var popup = new google.maps.InfoWindow();
```

Fig. 8. Google Maps Api.

5.3 Security Implementation

Because the information must be correct always, it was necessary to implement encryption passwords for each account and the same is performed by applying the following encryption code to the application. (**Figure 9**)

```
$password = md5($password);
```

Fig. 9. MD5 Encryption Code .

5.4 Upload Application to host

First entered the web site host and select the operation you want to perform , to upload files to the web application give in click on file manager where you can manage and load all the files that are scheduled , and then will can see to THROUGH the domain : http://centros-educativos-loja.co.nf/ The host offers similar to phpmyadmin web interface to manage the database and giving us the port 3306 to load , you can see all the data in (**Figure 10**) .

Database details for 1996111_centros

Below you find detailed information of your database

Database Host	fdb6.biz.nf
Database Port	3306
Database Name	1996111_centros
Database User	1996111_centros
Database Password	The password you have chosen. change
Database Version	5.5

Fig. 10. Characteristics of DB in the host.

5.5 Online Web Application

Once programmed files and uploaded to the host database can visualize the application already online. In the (**Figure 11**) is the Homepage : In the figure (**Figure**

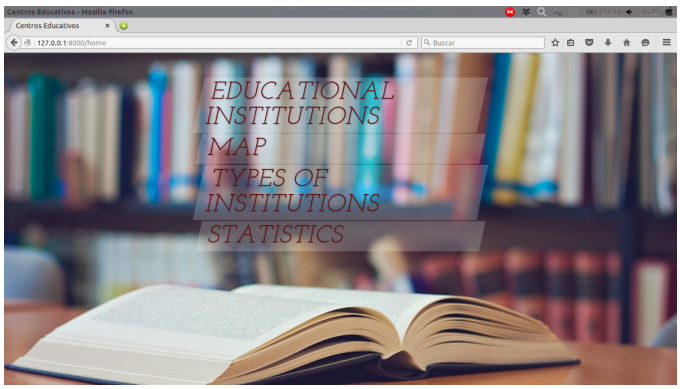

Fig. 11. Home Page of the Application .

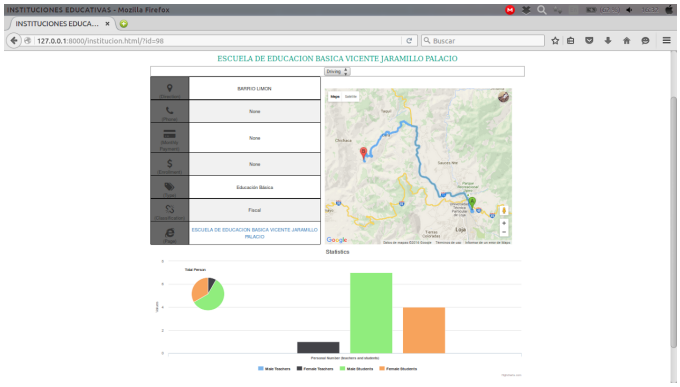

Fig. 12. Viewing Centers in the Application

12) the structure of each institution in the application is observed :

Finally we have the following networking features in the Web Application:

- Domain: http://centros-educativos-loja.co.nf/
- Host: biz.nf
- IP address: 83.125.22.197
- Port the server gives to the client server communication : 80
- Puerto Database : 3306

6 Conclusions

- When a user interacts with the application , you are working with the IP address of the site that gave the host and performs what is in each layer of the TCP / IP

- By domain and HTTP protocol users can find and make use of it the web application. http://centros-educativos-loja.co.nf/

- The host server gives us as a gateway for the client server communication port 80, and for interaction with the database have port 3306 .

- Using framework significantly reduces the time , and a more orderly and understandable for the simple fact of working with a pattern called Model View Controller mostly optimized code

- the time when the client makes a request to the server data path by walking some may be prone to theft of information , which is why you need to implement some form of security as data encryption , encryption , etc. to not be a victim of the disaster .

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