VPN

Internship-II (IT - 507) Project Report

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CERTIFICATE

This is to certify that the internship project titled " **VPN** " is the bona fide work carried out by **Shreya Sahu (0103IT171103) & Naincy Sahu (0103IT171063)** student/students of B.Tech.(Information Technology) of Lakshmi Narain College of Technology, Bhopal affiliated to Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal, Madhya Pradesh (India) during the academic year 2019-20, in partial fulfillment of the requirements for the award of the degree of Bachelor of Engineering (**Information Technology**) and that the project has not formed the basis for the award previously of any other degree, diploma, fellowship or any other similar title.

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Information Technology   **with Date**

Lakshmi Narain College of Technology, Bhopal

ABSTRACT

This is a model demonstrating the significance of VPN in today's World Wide Web era, today anything and everything kept over the internet is highly unsafe and unsecure. It shows how we can rely on the on growing technology i.e. VPN Tunneling, using which we can solve many of our security related concerns and issues. With the help of this on growing technology we can not only secure our database, personal information but can also be used to hide ourselves from this big envelope of Internet. By creating a Virtual Private Cloud we can easily manage our paramount organizational data keeping is safe and secure also making it accessible by our team members.

In this we have given access to multi – user with proper authentication for managing all the credentials related to criminals. It also include provision for entering new prisoner record along with other services of editing, updating, as well as deleting the records of criminals. We also have a safe system to store the credentials related to prison allotted to specific prisoner, along with maintaining dates of entry and release.

ACKNOWLEDGEMENT

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At last, I would thank to all my family, friends and my colleagues at LNCT bhopal who have taken sincere pain to boast my morale in the moments of despair and acted as a source of inspiration for completing the present moments of despair and acted as a source of inspiration for completing the present

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Chapter 1

Introduction

1.1 Problem Definition

Most enterprise organizations need a robust IP technology that creates a safe and encrypted connection tunnel over the less secure internet. In order to allow remote users and branch offices to securely access corporate applications and other resources, joint location problem (JLP) and link connectivity problems (LCP) need to be assured.

Think about all the times you've been on the go, reading emails while in line at the coffee shop, or checking your bank account while waiting at the doctor's office. Unless you were logged into a private Wi-Fi network that required a password, any data transmitted during your online session was likely vulnerable to eavesdropping by strangers using the same network.

It is also required when out and about, staying connected is often a necessity, and free Wi-Fi has become an important commodity for staying in touch with family members, as well as business colleagues. The added bonus is that using Wi-Fi won't chew through your smartphone data plan.

However, using public Wi-Fi can also be fraught with hazards. These include packet sniffers, falling into phishing scams via fake Wi-Fi connections, and being hacked or infected with malware. Whether we are a tin foil hat wearing cyber security aficionado or not, it's a sad but true fact that our privacy is in danger. Even when surfing the web, data is collected in droves by big brands people used to trust. Add to this the internet blocks being introduced even in western nations, and people are realizing the need to actively protect their own privacy.

1.2 Project Overview

This is a model demonstrating the significance of VPN in today's World Wide Web era, today anything and everthing kept over the internet is highly unsafe and unsecure. It shows how we can rely on the on growing technology i.e. VPN Tunneling, using which we can solve many of our security related concerns and issues. With the help of this on growing technology we can not only secure our database, personal information but can also be used to hide ourself from this big envelope of Internet. By creating a Virtual Private Cloud we can easily manage our paramount organizational data keeping is safe and secure also making it accessible by our team members.

By running proper specialized script for Centos – Operating System we are creating our own VPN using Open VPN protocol as a platform provider. Open VPN provide us with a key whenever we create a new network. It is mandatory for a user to have a copy of key already in system in correct format so as to enter in VPN. After this using a given ID Password one can access anything and everything over the network.

In this model we are demonstrating how country's important data related to criminals can be safely maintained over internet keeping it hidden from outer world. By making use of Virtual Private Cloud we can create our own Virtual Private Network over which we can host our web application over a public IP address, which will be accessible to users who have proper authentication ID as well as password along with a key for entering in VPC and for keeping our database much more secure we are maintaining it over a private IP address, this helps us in shielding our paramount data much more safe and secure from internet traffic.

In this we have given access to multi – user with proper authentication for managing all the credentials related to criminals. It also include provision for entering new prisoner record along with other services of editing, updating, as well as deleting the records of criminals. We also have a safe system to store the credentials related to prison alloted to specific prisoner, along with maintaining dates of entry and release.

1.3 Hardware Specifications:

- Processor (CPU) with 2 gigahertz (GHz) frequency or above
- A minimum of 4 GB of RAM
- Monitor Resolution 1024 X 768 or higher
- A minimum of 40 GB of available space on the hard disk
- Internet Connection Broadband (high-speed) Internet connection with a speed of 4 Mbps or higher
- Keyboard and a Microsoft Mouse or some other compatible pointing device
- Chrome* 36+ /
- Edge* 20+ /
- Mozilla Firefox 31+ /
- Internet Explorer 11+ (Windows only)

Browser Configuration:

Your browser must be configured as follows:
- JavaScript must be enabled
- Cookies must be enabled.
- Pop-up windows must be enabled.
- AWS Account

1.4 Software Specifications:

- Operating System : Windows 7+
- Apache Tomcat Server / Glassfish
- MySql Server Database
- Java version 8 +
- Putty and Puttygen (if windows)
- WinSCP
- OPENVPN

Chapter – 2

Literature Survey

2.1 Existing System

In the existing police people usually maintain records manually which is again time consuming and it is difficult to manage those records. There can be loss of records of important crimes and criminals. Major limitations in existing system are

- Time consuming
- Paper work needed
- Loss of records
- Information about criminals are not properly maintained.

Also without the use of VPN it is very difficult to secure such important data from internet traffic.

2.2 Proposed System

Virtual private network technology is based on the concept of *tunneling*. Just like a water pipe contains the liquid flowing inside of it, a VPN tunnel insulates and encapsulates internet traffic—usually with some type of encryption—to create a private tunnel of data as it flows inside an unsecured network.

As your internet traffic flows inside the VPN tunnel, it provides a secure, private connection between your computer and a different computer or server at another site. When paired with strong encryption, tunneling makes it virtually impossible for your data to viewed or hacked by others.

How Does VPN Tunneling Work?

It helps to think of VPN tunneling as a two-fold process of data encapsulation and data encryption.

- **Data encapsulation:** Encapsulation is the process of wrapping an internet data packet inside of another packet. You can think of this as the outer tunnel structure, like putting a letter inside of an envelope for sending.

- **Data encryption:** However, just having a tunnel isn't enough. Encryption scrambles and locks the contents of the letter, i.e. your data, so that it can't be open and read by anyone except the intended receiver.

Several encryption protocols have been created specifically for use with VPN tunnels. The most common types of VPN encryption protocols include IPSec, PPTP, L2TP, OpenVPN, IKEv2, SSTP, and OpenVPN.
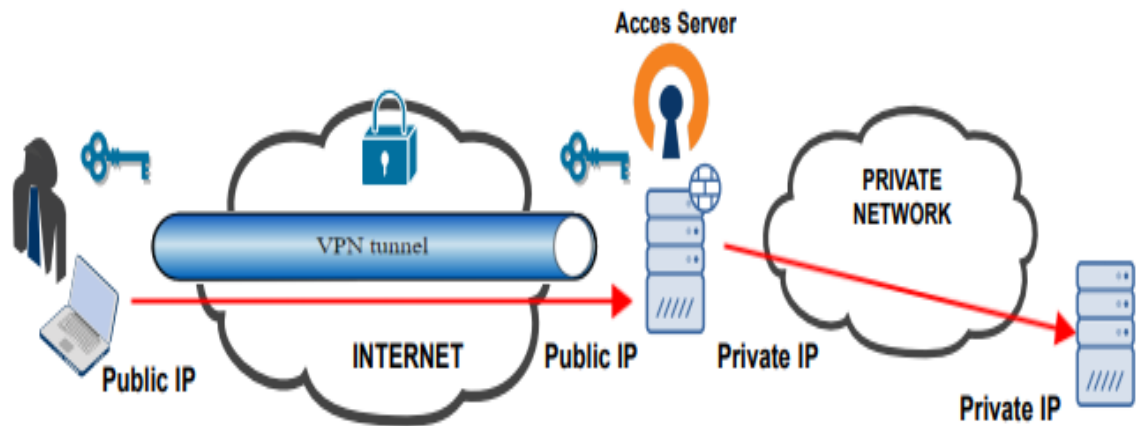

Fig : Figure shows how OPENVPN works.

OPENVPN

OpenVPN is an open-source protocol supported by all the major operating systems in use today (Mac, Windows, and Linux) as well as Android and iOS. It also supports lesser-known platforms, including OpenBSD, FreeBSD, NetBSD, and Solaris. It features up to 256-bit encryption using OpenSSL—a robust, commercial-grade, full-featured toolkit for the Transport Layer Security.

Saving the best for last, we have OpenVPN, a relatively recent open source tunneling protocol that uses AES 256-bit encryption to protect data packets. Because the protocol is open source, the code is vetted thoroughly and regularly by the security community, who are constantly looking for potential security flaws.

The protocol is configurable on Windows, Mac, Android, and iOS, although third-party software is required to set up the protocol, and the protocol can be hard to configure. After configuration, however, OpenVPN provides a strong and wide range of cryptographic algorithms that will allow users to keep their internet data secure and to even bypass firewalls at fast connection speeds.

Which VPN Tunneling Protocol Is Best?

Even though it's the fastest, you should steer clear of PPTP if you want to keep your internet data secure. L2TP/IPSec provides 256-bit encryption but is slower and struggles with firewalls given its fixed ports. SSTP, while very secure, is only available on Windows, and closed off from security checks for built-in backdoors. OpenVPN, with its open source code, strong encryption, and ability to bypass firewalls, is the best tunneling protocol to keep your internet data secure. While it requires third-party software that isn't available on all operating systems, for the most secure VPN connection to the internet, you'll want to use the OpenVPN protocol.
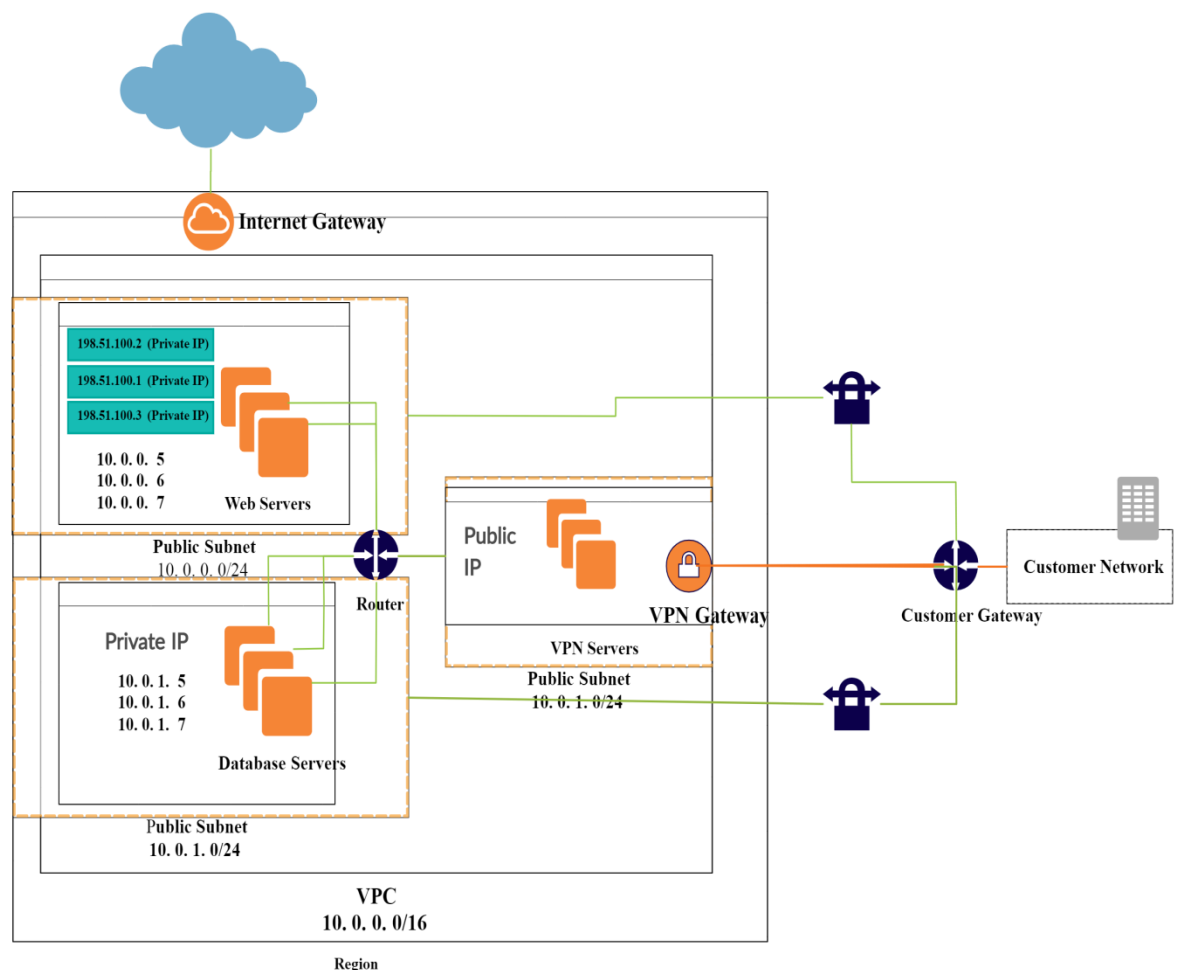

Fig: Project Model

Prisoner record:

As soon as the court declares that the victim is found guilty and tells his or her punishment and in which prison the victim must be kept, the prisoner will be send to the same prison as told by court and all the details of criminal like name, address, age, criminal number, crime and the punishment all can be updated in the prison management system.

Then later these details can be used further and there is no option to delete the prisoners data so once the prisoner is added to the database, no one can delete the data of the criminal without proper authentication. And it will be helpful as papers can get lost or can be theft but in this case information cannot be lost and there is no use of theft this data as no changes can be made in the database without permission.

Prisoners data cannot be lost because the backup of the database is there and the backup gets updated as soon as the changes are made into the database.

2.3 Feasibility Study:

ECONOMIC FEASIBILITY :

Economic analysis is most frequently used for evaluation of the effectiveness of the system. More commonly known as cost/benefit analysis the procedure is to determine the benefit and saving that are expected from a system and compare them with costs, decisions is made to design and implement the system. In the system, the organization is most satisfied by economic feasibility. Because, if the organization implements this system, it need not require any additional hardware resources as well as it will be saving lot of time.

TECHNICAL FEASIBILITY:

The system offers greater levels of user friendliness combined with greater processing speed. Therefore, the cost of maintenance can be reduced.

BEHAVIOURAL FEASIBILITY :

People are inherently resistant to change and computer has been known to facilitate changes. An estimate should be made of how strong the user is likely to move towards the development of computerized system. These are various levels of users in order to ensure proper authentication and authorization and security of sensitive data of the organization.
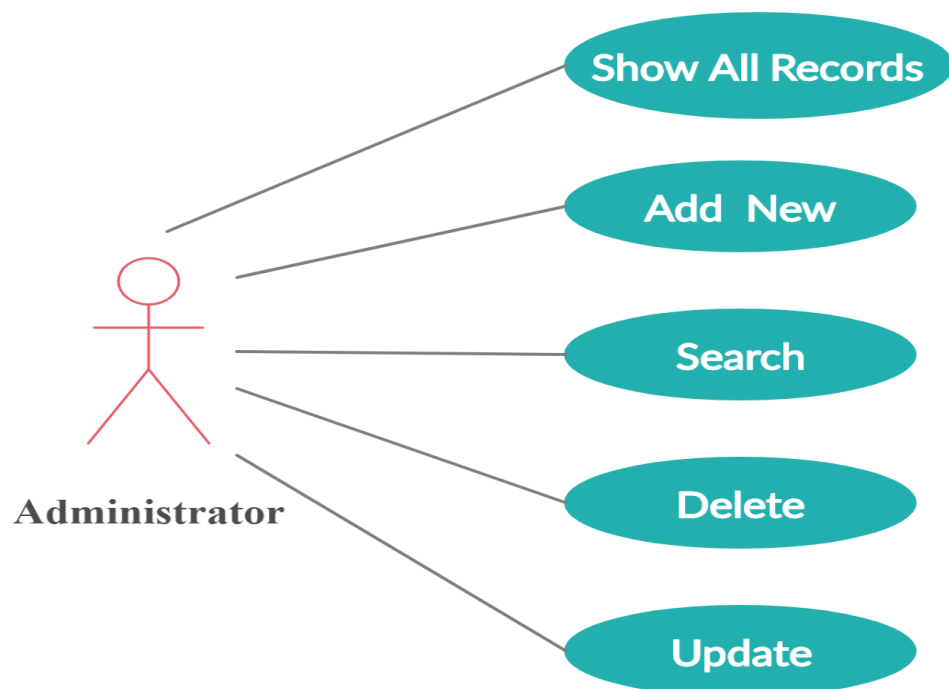
CHAPTER – 3

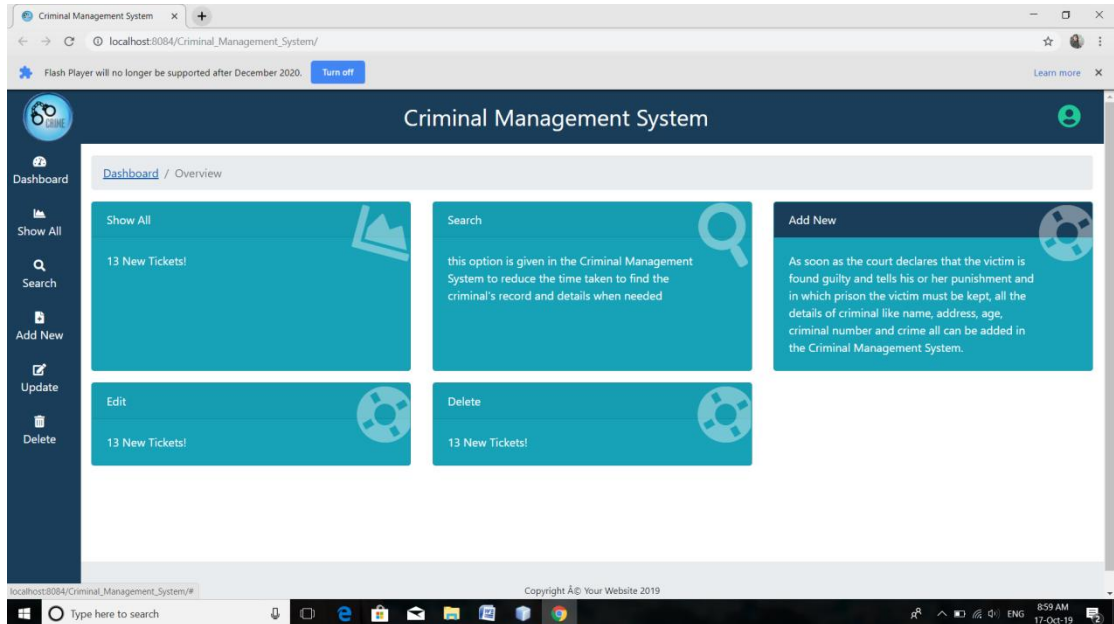# SYSTEM ANALYSIS & DESIGN

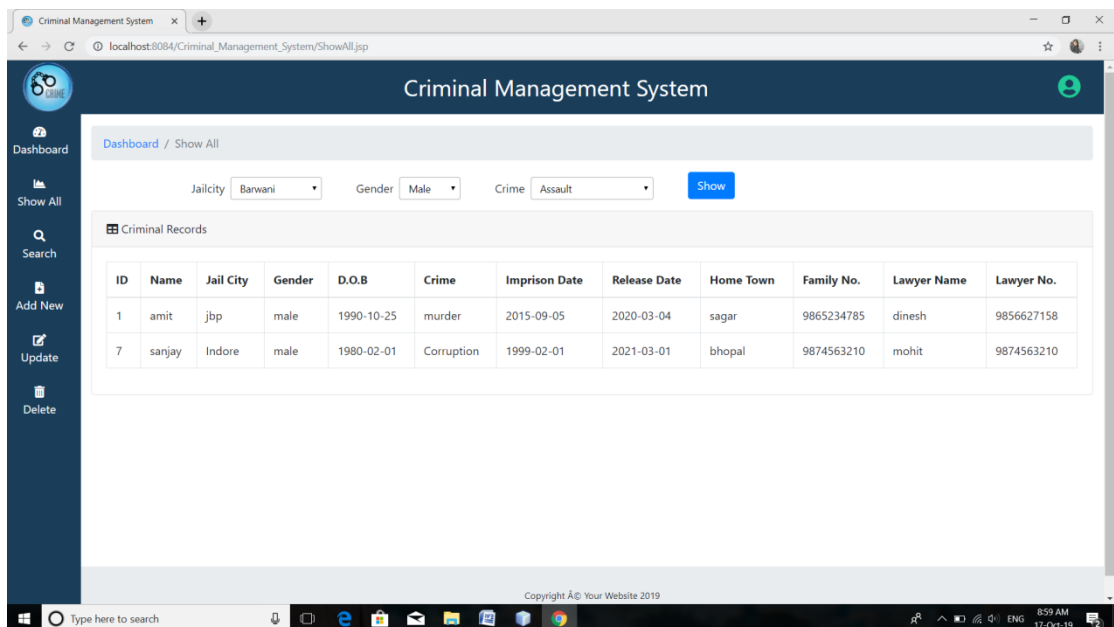## 3.1 E – R Diagram
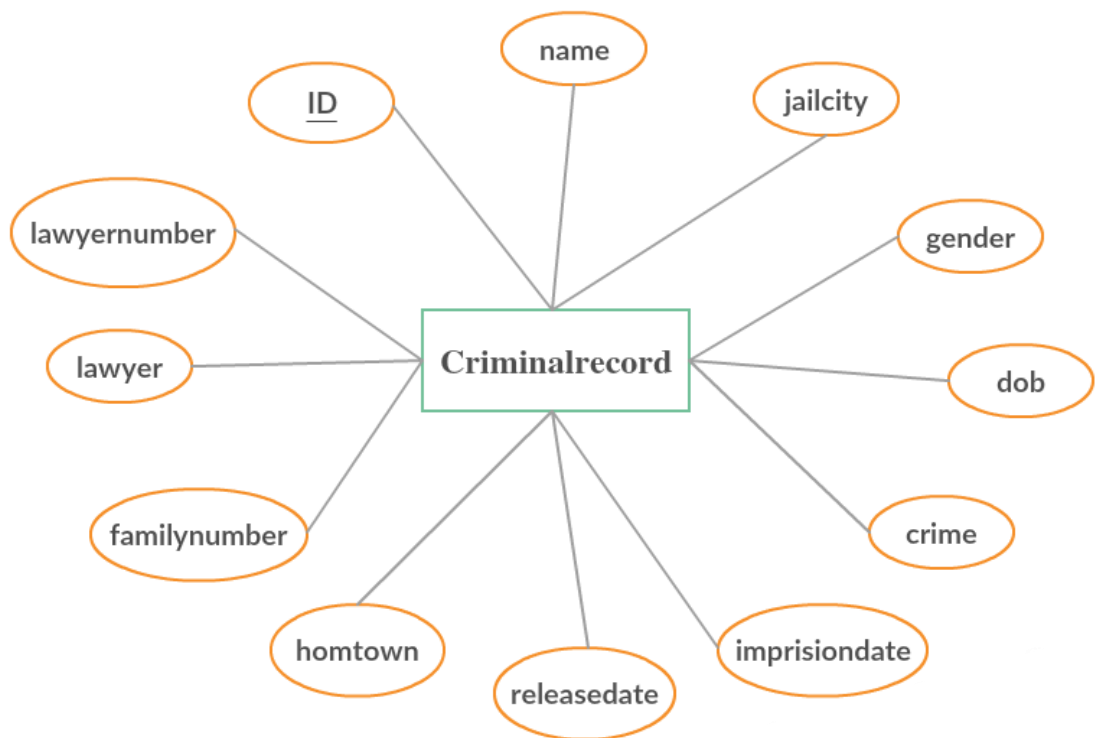
3.2 Use Case Diagram

OUTPUTS

Dashboard: This includes – about the website and all the functionalities.

Show All: This show all the records stored in the database.

Add New : here we can add a new record.

Delete: we can also delete a specific record or a group of records.

CONCLUSION

This is a model demonstrating the significance of VPN in today's World Wide Web era, today anything and everthing kept over the internet is highly unsafe and unsecure. It shows how we can rely on the on growing technology i.e. VPN Tunneling, using which we can solve many of our security related concerns and issues.

With the help of this on growing technology we can not only secure our database, personal information but can also be used to hide ourself from this big envelope of Internet. By creating a Virtual Private Cloud we can easily manage our paramount organizational data keeping is safe and secure also making it accessible by our team members.

As the internet traffic flows inside the VPN tunnel, it provides a secure, private connection between the computer and a different computer or server at another site. When paired with strong encryption, tunneling makes it virtually impossible for data to viewed or hacked by others. Thus, it provides a complete security for the sensitive data of Criminal Management System with easy access to the system.

REFERENCES

OpenVPN Documentation :

https://openvpn.net/community-resources/

AWS Documentation :

 https://docs.aws.amazon.com

Udemy Web Bootcamp by Angela Yu :

https://www.udemy.com/course/the-complete-web-development-bootcamp/

Stack over flow :

 https://stackoverflow.com

APPENDICES

A.1 Details of Software :

AWS account : Amazon Web Services(AWS) is a cloud service from Amazon, which provides services in the form of building blocks, these building blocks can be used to create and deploy any type of application in the cloud.

These services or building blocks are designed to work with each other, and result in applications which are sophisticated and highly scalable.

NetBeans: NetBeans is an integrated development environment (IDE) for Java. NetBeans allows applications to be developed from a set of modular software components called *modules*. NetBeans runs on Windows, macOS, Linux and Solaris. In addition to Java development, it has extensions for other languages like PHP, C, C++, HTML5 and JavaScript. The NetBeans IDE Bundle for Web & Java EE provides complete tools for all the latest Java EE 6 standards, including the new Java EE 6 Web Profile, Enterprise Java Beans (EJBs), servlets, Java Persistence API, web services, and annotations. NetBeans also supports the JSF 2.0 (Facelets), JavaServer Pages (JSP), Hibernate, Spring, and Struts frameworks, and the Java EE 5 and J2EE 1.4 platforms. It includes GlassFish and Apache Tomcat.

Apache Tomcat Server : Apache Tomcat (also referred to as Tomcat Server) implements several Java EE specifications including Java Servlet, JavaServer Pages (JSP), Java EL, and WebSocket, and provides a "pure Java" HTTP web server environment in which Java code can run.

Tomcat is developed and maintained by an open community of developers under the auspices of the Apache Software Foundation, released under the Apache License 2.0 license, and is open-source software.

MySQL : It is an open-source relational database management system (RDBMS). MySQL is free and open-source software under the terms of the GNU General Public License, and is also available under a variety of proprietary licenses. MySQL was owned and sponsored by the Swedish company MySQL AB, which was bought by Sun Microsystems (now Oracle Corporation). In 2010, when Oracle acquired Sun, Widenius forked the open-source MySQL project to create MariaDB. MySQL is used by many database-driven web applications, including Drupal, Joomla, phpBB, and WordPress. MySQL is also used by many popular websites, including Facebook, Flickr, MediaWiki, Twitter, and YouTube.

A.2 CODING :

(RecordsDao.java)

```java
package com.java.dao;

import com.java.bean.RecordBean;
import java.sql.*;
import java.util.*;
import java.util.Date;

public class RecordDao {

    public static Connection getConnection() throws ClassNotFoundException, SQLException
{
        Connection con = null;
        try {
            Class.forName("com.mysql.cj.jdbc.Driver");
            con =
DriverManager.getConnection("jdbc:mysql://localhost/ciminaldatabase?useSSL=false",
"root", "shreya*123");
            if (con != null) {
                System.out.println("Connection done");
            }
        } catch (Exception e) {
            System.out.println(e);
        }
        return con;
    }

    public static int insert(RecordBean r) {
        int status = 0;
        try {
            Connection con = getConnection();
            PreparedStatement pst = con.prepareStatement("insert into criminalrecord
(name,jailcity, gender, dob, crime,imprisondate, releasedate, hometown,familynumber,
lawyername,lawyernumber) VALUES(?,?,?,?,?,?,?,?,?,?,?)");

            pst.setString(1, r.getName());
            pst.setString(2, r.getJailcity());
            pst.setString(3, r.getGender());
            java.sql.Date sqlDate = new java.sql.Date(r.getDob().getTime());
            pst.setDate(4, sqlDate);
            pst.setString(5, r.getCrime());
            sqlDate = new java.sql.Date(r.getImprisondate().getTime());
            pst.setDate(6, sqlDate);
            sqlDate = new java.sql.Date(r.getReleasedate().getTime());
            pst.setDate(7, sqlDate);
            pst.setString(8, r.getHometown());
            pst.setString(9, r.getFamilynumber());
            pst.setString(10, r.getLawyername());
            pst.setString(11, r.getLawyernumber());
            status = pst.executeUpdate();
```

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```java
            System.out.println("Record succesfully Inserted !!");

        } catch (Exception e) {
            System.out.println(e);
        }
        return status;
    }

    public static int update(RecordBean r) throws ClassNotFoundException {
        int status = 0;
        try {
            Connection con = getConnection();
            PreparedStatement pst = con.prepareStatement("update criminalrecord set jailcity=?,
crime=?, releasedate=?, familynumber=?, lawyername=?, lawyernumber=? where id=? ");
            pst.setString(1, r.getJailcity());
            pst.setString(2, r.getCrime());
            java.sql.Date sqlDate = new java.sql.Date(r.getReleasedate().getTime());
            pst.setDate(3, sqlDate);
            pst.setString(4, r.getFamilynumber());
            pst.setString(5, r.getLawyername());
            pst.setString(6, r.getLawyernumber());
            pst.setInt(7, r.getId());
            status = pst.executeUpdate();

        } catch (SQLException e) {
            System.out.println(e);
        }
        return status;
    }

    public static int delete(RecordBean r) throws ClassNotFoundException {
        int status = 0;
        try {
            Connection con = getConnection();
            PreparedStatement pst = con.prepareStatement("delete from criminalrecord where
id=?");
            pst.setInt(1, r.getId());
            status = pst.executeUpdate();

        } catch (SQLException e) {
            System.out.println(e);
        }
        return status;
    }

    public static List<RecordBean> getAllRecords() {
        List<RecordBean> list = new ArrayList<RecordBean>();

        try {
            Connection con = getConnection();
            PreparedStatement ps = con.prepareStatement("select * from criminalrecord");
            ResultSet rs = ps.executeQuery();
            while (rs.next()) {
                System.out.println("fetch Data");
```

```java
            RecordBean r = new RecordBean();
             r.setId(rs.getInt("id"));
             r.setName(rs.getString("name"));
             r.setJailcity(rs.getString("jailcity"));
             r.setGender(rs.getString("gender"));
             r.setDob(rs.getDate("dob"));
             r.setCrime(rs.getString("crime"));
             r.setImprisondate(rs.getDate("imprisondate"));
             r.setReleasedate(rs.getDate("releasedate"));
             r.setHometown(rs.getString("hometown"));
             r.setFamilynumber(rs.getString("familynumber"));
             r.setLawyername(rs.getString("lawyername"));
             r.setLawyernumber(rs.getString("lawyernumber"));

             list.add(r);
           }
       } catch (Exception e) {
          System.out.println(e);

       }
       return list;

    }

    public static List<RecordBean> SearchRecords(RecordBean q1) {
       List<RecordBean> list = new ArrayList<RecordBean>();

       try {
          Connection con = getConnection();
          PreparedStatement pst = con.prepareStatement("select * from criminalrecord where
jailcity=? and gender=? and crime=?");
          pst.setString(1, q1.getJailcity());
          pst.setString(2, q1.getGender());
          pst.setString(3, q1.getCrime());

          ResultSet rs = pst.executeQuery();

          while (rs.next()) {

             RecordBean r = new RecordBean();
              r.setId(rs.getInt("id"));
             r.setName(rs.getString("name"));
             r.setJailcity(rs.getString("jailcity"));
             r.setGender(rs.getString("gender"));
             r.setDob(rs.getDate("dob"));
             r.setCrime(rs.getString("crime"));
             r.setImprisondate(rs.getDate("imprisondate"));
             r.setReleasedate(rs.getDate("releasedate"));
             r.setHometown(rs.getString("hometown"));
             r.setFamilynumber(rs.getString("familynumber"));
             r.setLawyername(rs.getString("lawyername"));
             r.setLawyernumber(rs.getString("lawyernumber"));
              System.out.print(rs.getInt("id"));
```

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```java
                        list.add(r);
                    }
            } catch (Exception e) {
                System.out.println(e);

            }
            return list;

        }

    public static RecordBean SearchRecordsById(RecordBean q1) {
        RecordBean r = new RecordBean();

        try {
            Connection con = getConnection();
            PreparedStatement pst = con.prepareStatement("select * from criminalrecord where
id=?");
            pst.setInt(1, q1.getId());

            ResultSet rs = pst.executeQuery();

            while (rs.next()) {

                r.setId(rs.getInt("id"));
                r.setName(rs.getString("name"));
                r.setJailcity(rs.getString("jailcity"));
                r.setGender(rs.getString("gender"));

                java.sql.Date dt = rs.getDate("dob");
                r.setDob(new java.util.Date(dt.getTime()));
//              r.setDob(rs.getDate("dob"));
                r.setCrime(rs.getString("crime"));
                r.setImprisondate(rs.getDate("imprisondate"));
                r.setReleasedate(rs.getDate("releasedate"));
                r.setHometown(rs.getString("hometown"));
                r.setFamilynumber(rs.getString("familynumber"));
                r.setLawyername(rs.getString("lawyername"));
                r.setLawyernumber(rs.getString("lawyernumber"));
                System.out.print(rs.getInt("id"));

            }
        } catch (Exception e) {
            System.out.println(e);

        }
        return r ;
    }

}
```

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