DESIGNING AN INFORMATION SYSTEM FOR INSTANT ACCESS FOR A COMPANY'S EMPLOYEES TO A GEOGRAPHICALLY DISTRIBUTED DATABASE

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Introduction

In the modern world, the development of information technologies has a huge impact on our lives. Many areas have already moved **online**. The coronavirus pandemic that began in 2020 has shown the importance of **remote work** and **remote access to information** for all categories of people. One of the most important requirements for remote work is the technical capability to provide a **quick access to insider information for all employees** of the enterprise at any time of the day or night.

Highlights

1. The best way of creating instant access for the employees of an enterprise to a geographically distributed database is using **VPN technology**, i. e. Virtual Private Network.

2. VPN allows to establish a **"virtual" network** of the enterprise by using the Internet capabilities. Any device within this network can "see" the other devices of this network while being physically located anywhere in the world.

3. **VPN** requires **encrypted channel**, so nobody can intercept information. It would take several millions of years to decode the information, which was encrypted by 128-bit RSA key.

4. The **frontend of the software** will be written in the **C++ programming language** by using **Qt 5.10 programming environment**. The application will be available for PCs running the **Windows** operating system and for **Android** mobile phones and tablets.

5. The database will be located in **PostgreSQL 9.5 DBMS** (Database Management System).

Fig. 1. Secured VPN Channel

Types of VPN Encryption

There are several popular **types of VPN encryption**:

1. **Symmetric-key**. This is where the key for encryption and decryption is the same, and both communicating parties must possess the same key in order to communicate.
2. **Public-key**.
3. **Handshake encryption** (RSA)
4. **Secure Hash Algorithm** (SHA)
5. **SSL** and **TLS**.
6. **OpenVPN**.
7. **IKEv2/IPsec**.
8. **L2TP/IPsec**.

It allows protecting data against **interception by hackers**.

What Is PostgreSQL?

PostgreSQL is an **object-relational database management system** (ORDBMS) based on POSTGRES, Version 4.2, developed at the University of California at Berkeley Computer Science Department. **POSTGRES** pioneered many concepts that only became available in some commercial database systems much later.

PostgreSQL is an **open-source** descendant of this original Berkeley code. It supports a large part of the SQL standard and offers many **modern features**: complex queries, foreign keys, triggers, updatable views, transactional integrity, multiversion, concurrency, control.

Also, PostgreSQL can be **extended by the user** in many ways, for example, by adding new data types, functions, operators, aggregate functions, index methods, and procedural languages.

Because of the **liberal license**, PostgreSQL can be used, modified, and distributed by anyone free of charge for any purpose, be it private, commercial, or academic.
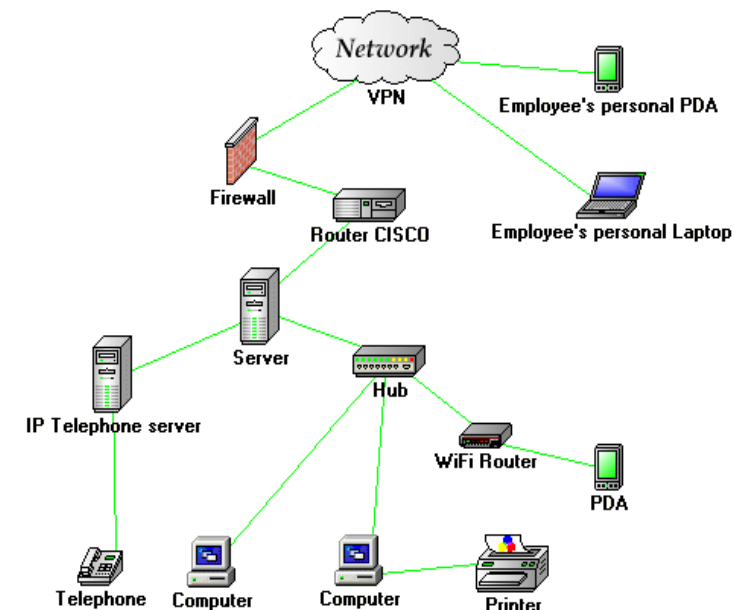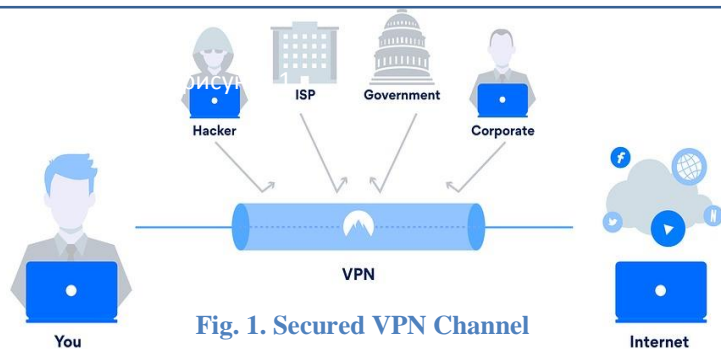

Fig. 2. PostgreSQL Logo

Fig. 3. Enterprise Virtual Network Diagram

Conclusion

VPN helps create a **highly protected virtual network** for the company's needs. Thanks to the **secure encrypted channel** nobody can intercept a company's data.

Using **PostgreSQL 9.5 DBMS** (Database Management System) is the best way to create a company's database.

Sources

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