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Access Security Of Borrower Information System With Point-To-Point Tunnelling Protocol

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ABSTRACT

The Loan Information System is an application developed to provide information on members who have obtained credit or loans from a cooperative. Member credit data is then processed in such a way and can be accessed by other cooperatives with a unique connection channel Virtual Private Network with the Point to Point Tunneling Protocol as security. Encryption and authentication are applied when the system is accessed to maintain data confidentiality, integrity and privacy. This security aims to protect member credit information from being accessed by parties who do not have access rights.

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1. Introduction

Puskospin Bumi Borneo is a Secondary Savings and Loans Cooperative or a cooperative centre formed by several primary cooperatives in the form of a Credit Union (CU) as an agency for the Development of primary cooperatives. One form of support for the Development of primary cooperatives is by providing a borrower information system application that is used to support decision-making when disbursing loans to members. The credit department of each credit cooperative will use information from the Borrower Information System as a reference in making decisions.

So far, it is often the case for credit staff to find it challenging to obtain information about loans from members who apply for loans from other credit cooperatives. This is because the facility in the form of an information system that can be used to share information between credit cooperatives is not yet available. So that the credit department does not have complete information in making decisions because the information only comes from the internal credit cooperative itself.

Applying rules in the decision-making process to grant members credit must apply the precautionary principle—the prudence principle by assessing several members' aspects, such as the ability to repay loans. Applying this precautionary principle requires data and information about members, including biodata, income, loans to other cooperatives, and important notes if they have ever been involved in a case that harms the cooperative institution. This information is considered after being researched and conducting a field survey to ensure its validity of the information.

In order to make the presentation process more accessible and more accurate, the Bumi Borneo Puskospin provides a Borrower Information System application that can be accessed online. The online system is easy to use and fast, with low costs [1]. With adequate data security, it uses a unique access point as a Virtual Private Network (VPN) with Point to Point Tunneling Protocol (PPTP). The security of the Borrower's information is guaranteed by parties who do not have access rights. Security access to information systems online is crucial because of the internet network.

According to Michael Stewart, a Virtual Private Network is a mechanism for establishing a secure remote access connection through an intermediary network, usually over the Internet. VPN uses encryption and authentication to maintain data confidentiality, integrity and privacy protection.

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Securing access to information systems using a VPN with the PPTP protocol can ensure the security of the information access process on the Borrower's information system used at Puskospin Bumi Borneo, accessed by the credit department of its member credit cooperatives.

2. Method

As already mentioned, securing access to the Borrower's information system using a VPN with the PPTP protocol makes access more secure.

2.1 Credit Union

In Indonesia, we are more familiar with the term savings and loan cooperatives than Credit Unions. There are similarities, but there are differences between the concept of savings and loan cooperatives that are commonly known in Indonesia. Credit Union is a cooperative financial institution owned and controlled by members who are operated to encourage frugal living, provide loans at competitive interest rates, and provide various other financial services to members [2] . Credit Unions in Indonesia are credit cooperatives under the auspices of the Ministry of Cooperatives and SMEs.

Based on the formulation of the understanding above, the Credit Union has the following principles:

a) Membership is open and voluntary
b) Democratic oversight
c) Economic participation of members
d) Autonomy and independent
e) Education and training
f) Cooperation between cooperatives
g) Concern for the community

The history of the Development of Credit Unions was conceived by Friedrich Wilhelm Raiffeisen, a mayor of Flammersfield, Germany, around the 18th century. Over time, Credit Unions developed and spread to various parts of the world, including West Kalimantan, Indonesia.

The Credit Union was started in 1970 through the MAWI (Indonesian Church Guardian Council) socio-economic section in Indonesia. MAWI assigned several Catholic clergies such as Father Albrecht Karim Arbie, SJ. So credit unions began to develop in Indonesia, including West Kalimantan. Especially in West Kalimantan, Credit Unions are pretty developed, so there are several Credit Unions such as KSP CU Lantang Tipo, KSP CU Pancur Kasih, Etc.

These several credit unions have jointly established a forum as the centre, which aims to develop credit unions together. One of the centres in West Kalimantan is the Earth Borneo Savings and Loans Cooperative Center (Puskospin Bumi Borneo).

To run a business in the form of loans, Credit Unions must apply the precautionary principle to avoid high levels of bad loans [3]. The precautionary principle is described by the Research Monograph World Council Of Credit Unions Toolkit Series [4]:

Credit Unions health monitoring which includes P=*Protection*
E= *Effective Financial Structure*
A = Assets Quality
R = *Rates of Return and Costs*
L = *Liquidity*
S = *Signs of Growth*

2.2 Puskospin Bumi Borneo

It is a secondary cooperative established by several credit unions as a forum for joint Development of credit unions, such as training and education centres, coordinating, advocacy and managerial bodies for credit union royal stronghold [5].

The Borneo Puskopdit was established to improve the quality of Primer CUs, especially the needs of Primary CUs in education, assistance, deposit insurance management, loans, and Development and application of information technology.

In order to realize this great mission, Puskopdit Borneo is committed to professionally providing the best service and continues to strive to innovate in order to improve full service by creating innovative products and services as well as trying to encourage innovation in the field of information technology by applying the

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principles of Credit Union. One form of Puskospin Bumi Borneo's support to Credit Union members is to provide a Borrower Information System application.

2.3 Borrower Information System.

The Borrower information system is an information system developed by Puskospin Bumi Borneo, which presents borrower information, including the Borrower's profile and the status of the loan, whether it is current or non-performing. The purpose of developing a borrower information system is due to the demands of the current conditions where there is high competition so that the company develops well and demands a fast and accurate system to win the competition for products and services. Software is inseparable and plays a crucial role in supporting this, so it requires fast software to help companies take the opportunities that exist [6].

A web-based borrower information system is built using the PHP programming language and a database using a MySQL server as an information storage medium. The software development method used is the Incremental method. Incremental Development involves the gradual production and delivery of software in multiple versions. Each release version will result in new functional enhancements in the software. Figure 1. illustrates a general method for Incremental Development (Sommerville, 2016).

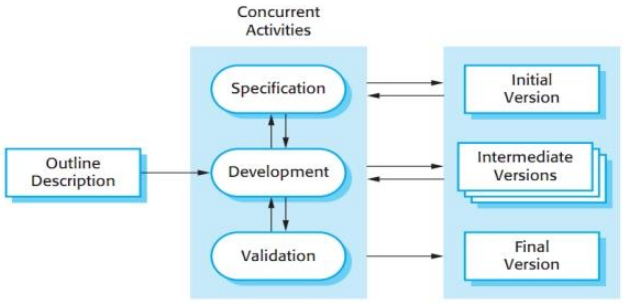


Figure 1. Method of Incremental Information System Development

2.4 Virtual Private Network

Virtual Private Network (VPN) "is a mechanism for establishing a secure remote access connection through an intermediary network, usually over the Internet. VPN uses encryption and authentication to maintain data confidentiality, integrity and privacy protection" [8]. VPN networks use GRE tunnel technology and can connect more than one router to another. Using the GRE protocol so that it can deliver packets [9]. Using a Virtual Private Network is one way to build secure communication lines for clients and remote servers through public networks. VPN presents technology that secures all virtual network traffic to provide a sense of security for all network users [10].

Here are the criteria that a VPN must meet in responding to the industry's challenges:

a) Authenticate users who do access
b) Static addressing management
c) Encryption of data exchanged
d) Access key management

Encrypted data will be safer even though it has increased in size because the encryption process will usually increase the size of the transmitted packet header [11].

2.5 Point to Point Tunnel Protocol (PPTP)

Point to Point Tunnel Protocol (PPTP) is one of the protocols used to establish a Virtual Private Network connection that can secure the file transfer process from server to server or from server to Client developed by the Internet Engineering Task Force (IETF). PPTP can be implemented on the internet network or the PPTP network [12]. It can also be used on private or local networks [13]. A PPTP connection consists of a Server and a Client. Many network devices have implemented or provided PPTP features on router operating system packages, such as on some Mikrotik router devices.

Mikrotik RouterOS can be used as a server, Client, or even on the same machine. This feature is included in the PPP package. To check in the system package menu whether the package is already on the router or not. The PPTP Client function already exists in almost all Mikrotik router operating systems, so that we can use a Laptop/PC as a PPTP Client. Usually, PPTP is used for networks that have passed through a multihop router (Routed Network). PPTP service uses the TCP 1723 protocol and IP Protocol 47/GRE to encapsulate the data

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in data packets [14]. The following illustrates a diagram of securing information system access using a VPN with the PPTP protocol.

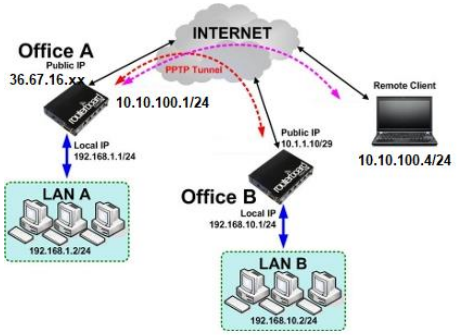


Figure 2. VPN Topology with PPTP Protocol

Based on Figures. 1, shows the mechanism for establishing a unique path or tunnel so that the server relationship with the Client or remote Client is more secure than before. VPN networks that utilize the internet network will be connected like a regular local network [15]. That connecting via the VPN internet network will have a unique path. This connection fits perfectly with the needs of Puskospin Bumi Borneo concerning its primary cooperatives spread across various districts in West Kalimantan.

3. Result and Discussion

Implementation of securing access to the Borrower's information system using a VPN with the PPTP protocol using a Mikrotik router. This implementation will use a server connection with a remote client only. The following are the topology and configuration stages:

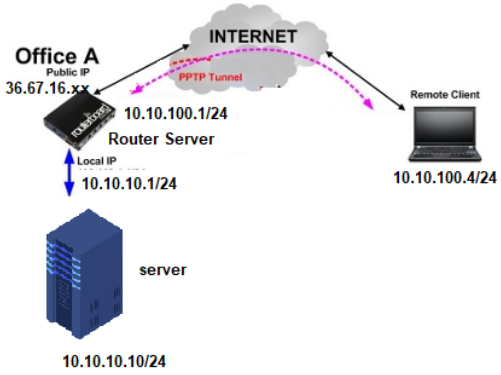


Figure 3. Server and Remote Client Connection

The server is located at the Puskospin Bumi Borneo office in Pontianak, while remote clients are spread across various branches of the regional primary cooperative service office in West Kalimantan. The following are the steps for configuring the Borrower's information system access security using a VPN with the PPTP protocol:

3.1 Konfiguration Server

Based on the topology in Figure 2 above, the PPTP server is Router Office A, so we have to set the PPTP Server on the router. Enable PPTP Server. The first step that must be done is to activate the PPTP server. Enter the PPP menu, then select Interface. In the bottom box, selects PPTP Server. Fill the default profile with "Default-encryption" so the VPN path is encrypted.

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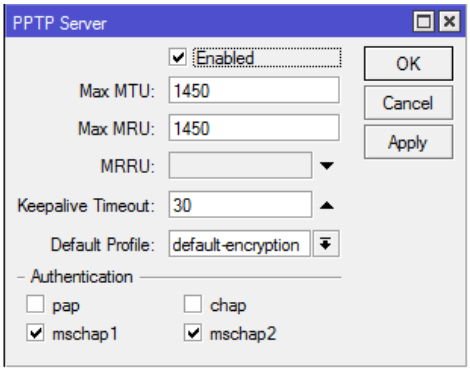


Figure 4. Activating the PPTP server

3.2 Secret

After activating the PPTP server, in the next step, we must create a username and password, usually called a secret. This secret or username and password will be used for the client authentication process that will connect to the PPTP server and only be able to access the Borrower's information system. The use of uppercase and lowercase letters will have an effect. Local Address is the IP address that will be attached to the router itself after the PPTP link is established. Remote Address is the IP address that will be given to the Client after the PPTP link is formed, as shown.

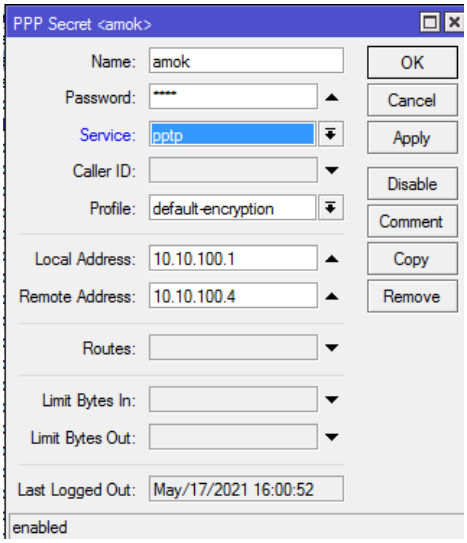


Figure 5. Client User Id and Password

3.3 Remote Client

PPTP Client using the Windows 2010 operating system, enter the Network and Sharing centre as follows:

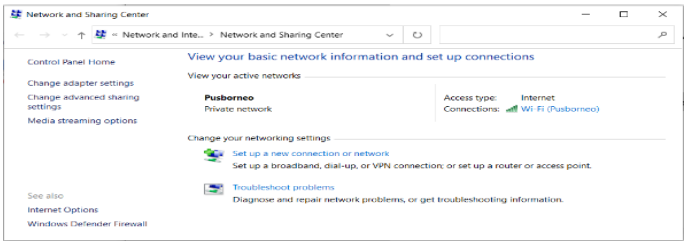


Figure 6. Network and Sharing Center Windows 2010

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Next, select Set up a new connection or network, then connect to a workplace and select use internet connection. Enter the IP Address of the router's public IP. According to the topology, we enter the public IP address of Router A. Destination name is a parameter to give a name to the created VPN interface and fill it with VPN SIP. When finished, the VPN connection with PPTP is ready to use

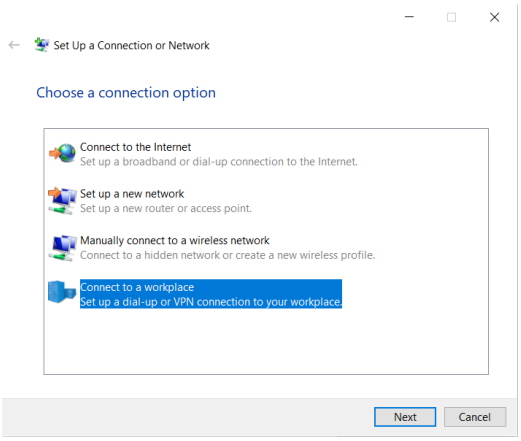


Figure 7. Network and Sharing Center Windows 2010

Select use internet connection (VPN), enter the router's Public IP address in the internet address and Destination name fields.

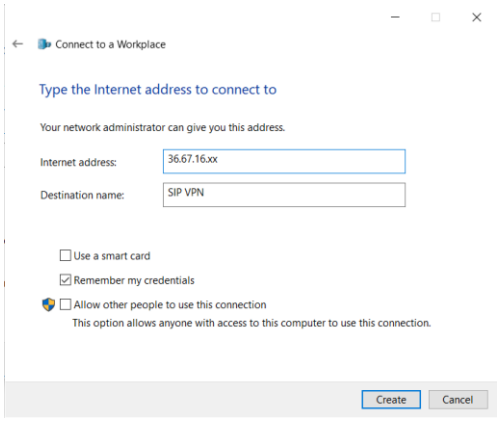


Figure 8. IP Address PPTP server

After the VPN configuration with PPTP has been completed, the connection is ready to use, and then the remote Client connects to the VPN server using the VPN connection user that has been created.

3.4 Access to The Borrower's Informastion System

Securing access to the Borrower's information system can be done after the application has been installed on the server with IP address 10.10.10.10/24. By the topology of Figure 2. Server and Remote Client topology. Next, we make a VPN connection according to the previously created user: amok and password: amok. If it is connected, it will look as follows :

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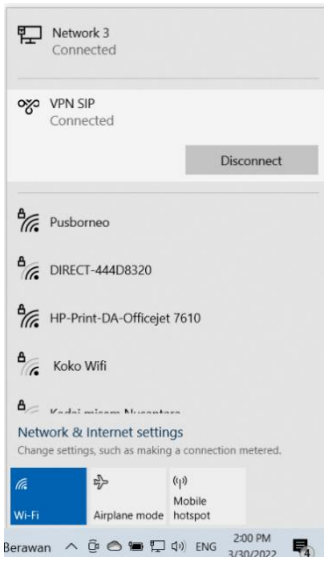


Figure 9. VPN Connection on Remote Client

The next step is to access the Borrower's information system application via a remote client by typing the local IP address of the server 10.10.10.10/sip. The application login page displays as follows.

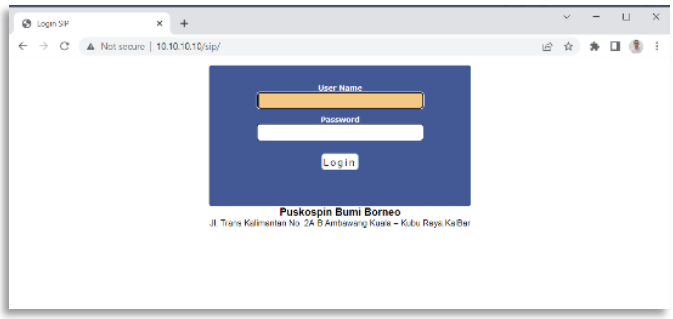


Figure 10. Borrower Information System Login Page

The connection to access the Borrower's information system from the Remote Client to the application server corresponds to the server IP address in Figure 2. If we want to enter into our application, log in according to the application user id and password provided by the borrower information system administrator.

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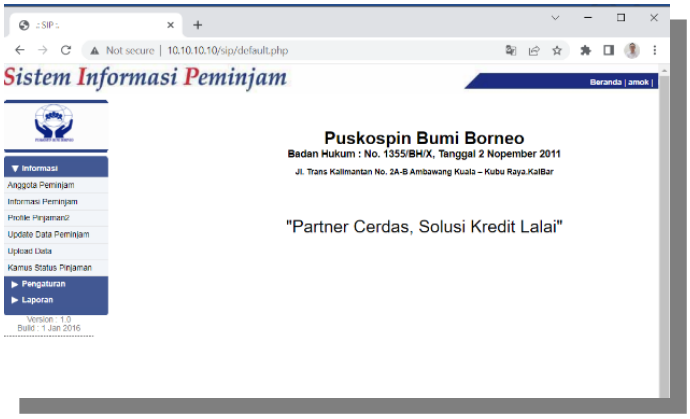


Figure 11. Borrower Information System Homepage

After successfully logging in to the application's home page, the access connection is a VPN with the PPTP protocol, which is safer than without a VPN. The following is an example of the information presented in the Borrower's information system.

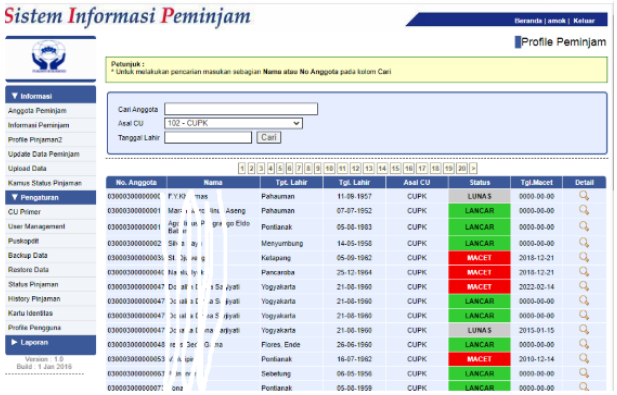


Figure 12. Borrower Information Pages

Figure 11. Present borrower data from various primary cooperatives in Puskospin Bumi Borneo, which periodically reports or submits the latest borrower data monthly. The data presented on this page is still global, namely member number, the origin of the primary cooperative, loan status and date of loss.

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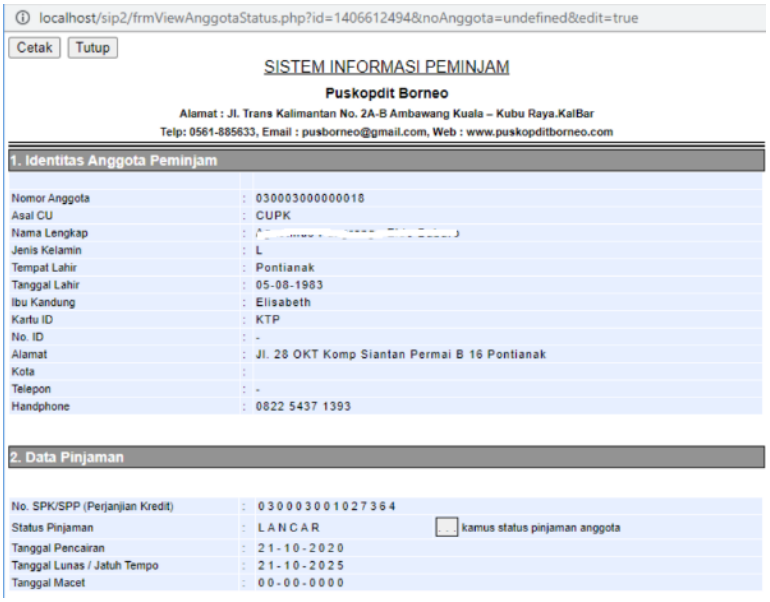


Figure 13. Halaman Informasi Peminjam

Figure. 12 provides complete information regarding borrower data, which will be beneficial for the primary cooperative credit department in assessing the ability of members who apply for loans.

4. Conclusion

Based on the results of the implementation of securing access to the borrower's information system using a VPN with the PPTP protocol can be used to build a particular path to access the Borrower Information system of the Bumi Borneo Puskospin. Encrypted connection path and information so that the data accessed will be random when accessed from the client-side and information becomes more secure.

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