Pusat Penelitian dan Pengabdian Masyarakat
STMIK Nusa Mandiri

SURAT TUGAS

060/B.01/PPPM-NM/IX/2020

Tentang

PENELITIAN YANG DIPUBLIKASIKAN DALAM JURNAL ILMIAH
Periode September 2020 - Februari 2021

Menulis pada Jurnal Teknik Informatika C.I.T Medicom, Vol. 12, No. 2, September 2020
(p-ISSN: 2337-8646, e-ISSN: 2721-561X)

Judul :

Implementation of VPN Using Router MikroTik at Al-Basyariah Education Foundation Bogor

Menimbang :

1. Bahwa perlu diadakan pelaksanaan Tridharma Perguruan Tinggi dalam bentuk Penelitian.
2. untuk Keperluan pada butir 1 (satu) diatas, maka perlu dibentuk tugas yang berkaitan dengan penelitian yang dipublikasikan dalam Jurnal Ilmiah.

MEMUTUSKAN

Pertama : Menugaskan kepada saudara

Muhamad Ryansyah M.Kom

Sebagai Penulis yang mempublikasikan Penelitianya pada Jurnal Ilmiah.

Kedua : Mempunyai tugas sbb:
Melaksanakan Tugas yang diberikan dengan penuh rasa tanggung jawab.

Ketiga : Keputusan ini berlaku sejak tanggal ditetapkan, dengan ketentuan apabila dikemudian hari terdapat kekeliruan akan diubah dan diperbaiki sebagaimana mestinya

Jakarta,1 September 2020

Ketua PPPM

Sekolah Tinggi Manajemen Informatika dan Komputer Nusa Mandiri

Norma Yunita, M.Kom

Tembusan

- Ketua Sekolah Tinggi Manajemen Informatika dan Komputer Nusa Mandiri
- Arsip
- Ybs

Jurnal Teknik Informatika C.I.T Medicom, Vol. 12 No. 2, September (2020) p-ISSN 2337-8646 e-ISSN 2721-561X

Contents lists available at Publisher Institute of Computer Science (IOCS Publisher)

Jurnal Teknik Informatika C.I.T Medicom

journal homepage: www.medikom.iocspublisher.org/index.php/JTI

Implementation of VPN Using Router MikroTik at Al-Basyariah Education Foundation Bogor

Numan Musyaffa[1], Muhamad Ryansyah[2]

[1,2] Information Systems, STMIK Nusa Mandiri Jakarta, Jalan Jatiwaringin Raya No.02 Jakarta Timur 13620

Email : numan.nfm@nusamandiri.ac.id

ARTICLE INFO

Article history:
Received: 27/07/2020
Revised: 31/08/2020
Accepted: 01/09/2020
Available online 30/09/2020

Keywords:
VPN, Mikrotik, Internet

ABSTRACT

VPN is a connection between one network with another network privately through a public network. At Al-Basyariah Education Foundation is a school that has several buildings far apart. The problems faced today that are in several areas related to and communicating using flash and using file shares for those who already have their own LAN. Meanwhile, to connect with the main building and the branch building using the internet and email to send data and communicate. By using a VPN (Virtual Private Network) build a network using the PPTP (Point-To-Point Tunneling Protocol) method with the Mikrotik Router RB2011L then the main building and branch building can be connected. Thus the Al-Basyariah Education Foundation can be connected and can access computer networks anywhere via the internet.

1. Introduction

With the development of technology, the need for communication networks is increasing. Initially, data exchange was only through hard copy in the form of handwritten documents, monthly reports and so on. When this has developed into communication using the Internet network because of the demands of time and efficiency. Data communication over the Internet network involves transfer speed and security issues. Things that must be considered in carrying out activities in the world of the Internet, namely with the increasing number of people trying to intercept data passing by and other crimes on the Internet.

VPN stands for virtual private network, which is a private network (not for public access) that uses non-personal media (for example the internet) to connect between remote sites securely. The application of certain technology is also needed because this network uses a common medium, but traffic (traffic) between remote-sites cannot be intercepted easily, nor does it allow other parties to sneak undue traffic into remote-sites.[1]

The Al-Basyariah Education Foundation is a school which has several buildings far apart. The problems faced at this time are in several areas relating to and communicating using flash drives and using file shares for those who already have their own LAN. Meanwhile, to communicate between buildings and between buildings using the internet and email to send data and communicate.

To overcome the problems that occur at the Al-Basyariah Education Foundation, a VPN (Virtual Private Network) is needed so that it can be connected to each other between buildings that are in a certain range. Therefore, the authors took the theme with the title "Implementation of VPN (Virtual Private Network) Using a Mikrotik Router at the Bogor Al-Basyariah Education Foundation".

In the research process, a relevant resource is needed to support each idea. Here the authors list three scientific journals that are relevant to the research that the author has discussed. Based on the research conducted.

Jurnal Teknik Informatika C.I.T Medicom, Vol. 12 No. 2, September (2020) p-ISSN 2337-8646 e-ISSN 2721-561X
Contents lists available at Publisher Institute of Computer Science (IOCS Publisher)
Jurnal Teknik Informatika C.I.T Medicom
journal homepage: www.medikom.iocspublisher.org/index.php/JTI

The rapid development of computer technology has resulted in business entities and academic institutions implementing this technology for many purposes. Problems arise when connecting users or other networks that are far away or geographically separated. Not only in business entities, academic institutions such as UNDIP also face almost the same problems. The SIA (Academic Information System) service that has long been owned by UNDIP can only be opened from the local network, this is because placing the SIA server on a public network is very risky. One solution that can solve this problem is to build a Virtual Private Network (VPN), with a VPN it is possible for a remote user or network to connect as in a local network. Meanwhile, for web applications, a web proxy application can be used to access local web-based services. The purpose of this research is to study the use, workings and functions of OpenVPN and Glype Proxy to access local applications from public networks, and implement them on the Diponegoro University network.[2]

Computer networks are the right choice for both companies and personalities to provide information and connect a LAN network to the internet. This can be seen from the increasing use of the internet. PT. Valdo International is a company engaged in the Outsourcing Tele Marketing for bank and insurance that always pays attention to client needs for data security on the internet. When clients exchange data information, this is very possible for parties to commit theft as long as the data is transmitted on the internet. One way to build data communication security in the internet network is to use a Virtual Private Network (VPN). Virtual Private Network (VPN) technology allows each user to access resources in the local network, get the same rights and settings as physically being in the place where the local network is located. The use of a VPN (Virtual Private Network) is an alternative for sending voice, which is private or secure, because of the use of an encrypted connection and the use of private keys, certificates, usernames or passwords to authenticate in establishing connections.[3]

The development of computer networks is very rapid. Computer networks have become fundamental in business activities. This can be seen from the majority of people in the world who have accessed the internet. At PT. Anta Citra Arges (ACA) and PT. Interdev (INT), the two companies that are still the same owner, are quite far away and the data exchange that is carried out by these two companies is using email, but for data that is important and large it is quite difficult to use the email media. As a solution in sending and protecting important company data when transmitting data. This research is compiled based on several previous studies, including from research entitled Comparative Analysis of the Performance of a Mikrotik-based VPN Network using the Point to Point Tunneling Protocol (Pptp) and Layer 2 Tunneling Protocol (L2tp) as Data Transfer Media. In his research report, a VPN was built so that the use of a VPN network can provide an alternative to accessing a website that is adjacent to the VPN network itself .[4]

2. Research methods

This study uses problem analysis in a correct network which is expected to be able to connect two different locations to be able to communicate smoothly and safely with each other.[5]

A. Time and Place of Research

The research was carried out by analyzing (directly) to the research site, namely the Al-Basyariah Education Foundation which was conducted from July 2020 to August 19, 2020.

B. Research Targets

Build a VPN (Virtual Private Network) connection network at the Al-Basyariah Education Foundation so that each building can be connected securely and can access computer networks anywhere via the internet network.

C. Data, Instruments, and Data Collection Techniques

To support this research, the authors use the following data collection techniques:

1) Observation

In this case the writer made direct observations about the existing network at the Al-Basyariah Education Foundation and documented the results of the observations.

Jurnal Teknik Informatika C.I.T Medicom, Vol. 12 No. 2, September (2020) p-ISSN 2337-8646 e-ISSN 2721-561X
Contents lists available at Publisher Institute of Computer Science (IOCS Publisher)
Jurnal Teknik Informatika C.I.T Medicom
journal homepage: www.medikom.iocspublisher.org/index.php/JTI

2) Interview

Methods for obtaining information in involving the speaker directly in an interview. The author asks several questions and conducts discussions to obtain the required data.

3) Literature review

The method of collecting data is by collecting information and sources or references that are relevant to the issues discussed.

D. Building Computer Networks

That the purpose of a computer network is to be able to reach and receive acceptance, every part of the computer network can request and provide services. Parties that apologize or receive services are called clients and those who provide or send services are called servers. This design is called a client-server system, and is used in almost all computer network applications.[6]

Al-Basyariah Education Foundation uses transmission media using unshielded twisted pair (UTP) cables, fiber optic and wireless networks. The topology used in the Al-Basyariah Education Foundation LAN, which the research author uses, uses the Tree topology, because the network that is on the proxy is the center so that different computer networks in buildings will get internet access via mikrotik and other access control.

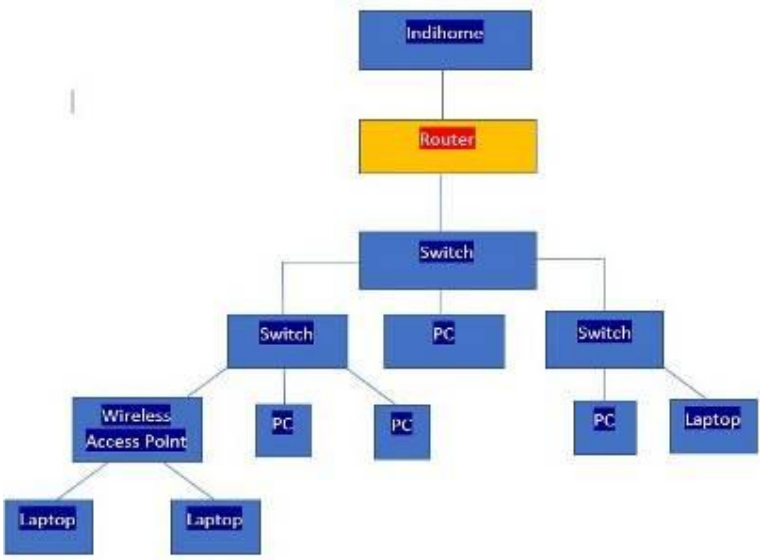

Fig 1. Topology at Al-Basyariah

E. Network Architecture

The network architecture used by the Al-Basyariah Education Foundation uses a client server model network, in this architecture there is a section called the server. Client server is a network connectivity model that differentiates computer functions as a client and a server. This architecture places a computer as a server. This server is in charge of providing services to other terminals connected to the network system or what we call the client. Servers can also be tasked with providing file sharing services (file servers), printers (printer servers), and communication lines.

In this architectural model, the client cannot function as a server, but the server can function as a client (non-dedicated server). The working principle of this architecture is very simple, where the server will wait for requests from the client, process and provide results to the client, while the client will send requests to the server, wait for the process and see the visualization of the results of the process. This Client Server system is not only intended for large-scale computer network development. This system uses the main protocol Transmision Control Protocol or Internet Protocol (TCP / IP).

Jurnal Teknik Informatika C.I.T Medicom, Vol. 12 No. 2, September (2020) p-ISSN 2337-8646 e-ISSN 2721-561X
Contents lists available at Publisher Institute of Computer Science (IOCS Publisher)
Jurnal Teknik Informatika C.I.T Medicom
journal homepage: www.medikom.iocspublisher.org/index.php/JTI

F. Network Scheme

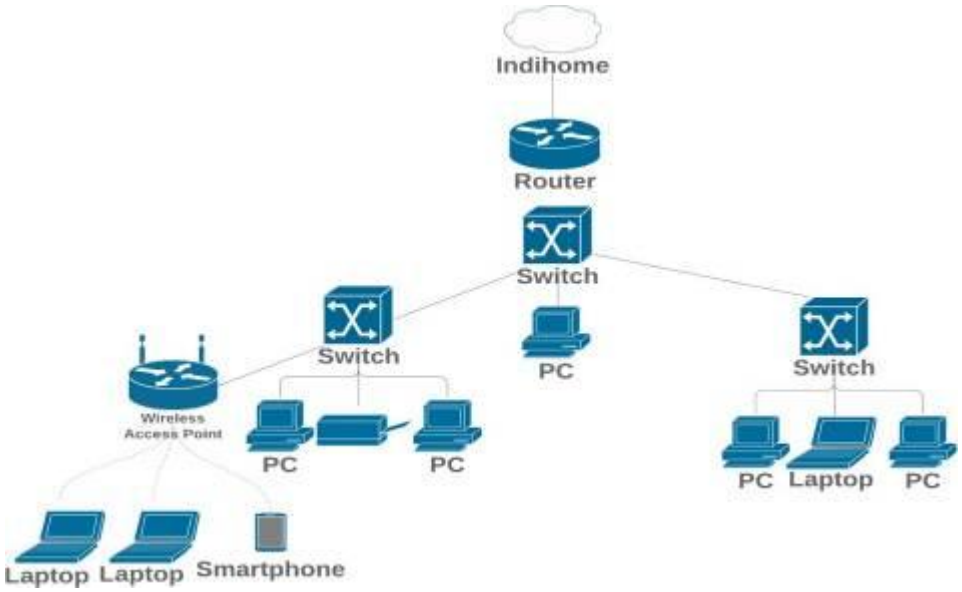

Fig 2. Running Network Scheme

The network scheme image above is a network scheme located at the Al-Basyariah Education Foundation, in the network scheme above it can be explained that the internet source in the main building uses an indihome ISP. Mikrotik RouterBoard2011L is able to share the internet network to each PC user connected via the interface port and manage or determine the communication path between the user's computer, through this Mikrotik RouterBoard RB2011L the internet network is distributed to each switch in each room, so that each user can access the internet easily.

G. Network Hardware and Software Specifications

Based on the research that the author did and data collection based on interviews with network administrator staff, it can be concluded that the hardware and software specifications of the Al-Basyariah Education Foundation are as follows:

Table 1.
Network Hardware and Software Specifications

No	Nama	Spesifikasi	Operating System
1	Kabel UTP	Cat 5	
2	Mikrotik RB2011L	CPU AR9344 600Mhz RAM 54mb	Router OS
3	Switch	D-Link DES-1024C	- IEEE 802.3 10 BASE-T - IEEE 802.3u 100 BASE-TX - IEEE 802.3az Energy- Efficient Ethernet
4	Access Point	Tp-link TL-WA5210G	Point to Point Point to multi point AP/Client/Bridge

H. Alternative Troubleshooting

Based on the problems that exist at the Al-Basyariah Education Foundation, the authors provide alternative solutions to problems, here are the alternatives:

Connect the main building to the branch building and create a VPN (Virtual Private Network) network so that the main building and the branch building can be connected securely to access LAN (Local Area Network), can exchange data via an internet connection or other network to transmit data privately. By

Jurnal Teknik Informatika C.I.T Medicom, Vol. 12 No. 2, September (2020) p-ISSN 2337-8646 e-ISSN 2721-561X
Contents lists available at Publisher Institute of Computer Science (IOCS Publisher)
Jurnal Teknik Informatika C.I.T Medicom
journal homepage: www.medikom.iocspublisher.org/index.php/JTI

using a VPN (Virtual Private Network), we can avoid intruders when transmitting data that can enter network traffic at any time.

3. Result and Discussion

A. Proposed Network

The need for school activities is quite a lot, requiring speed or time efficiency which is very important in data transfer or data sharing at the Al-Basyariah Education Foundation, with the existence of an interconnection between internal units in each building which can solve the problems that have been faced so far. the slow exchange of information and data exchange that should be done quickly for every staff in the main building and branch buildings without any obstacles so that work and work time becomes more efficient.

In overcoming the problem of limited access speed and data security used by data to exchange data between buildings, the solution can be done with the PPTP (Point-To-Point Tunneling Protocol) method on the microtics that are already available in each building. PPTP (Point-To-Point Tunneling Protocol) is a method for creating a private line over a public line, the implementation of this tunneling method is mostly done by IT circles by utilizing existing computer network devices without having to pay expensive fees to rent a VPN will be an additional expense for the company.

Judging from the addition of the configuration made in the proxy which previously did not use the Tunneling Protocol feature to create a private path between the main building connection and the branch building, the proposed scheme was proposed with the addition of the PPTP Tunneling Protocol configuration that was configured by the proxy in each building as following.

The following is an explanation of the proposed network at the Al-Basyariah Education Foundation :

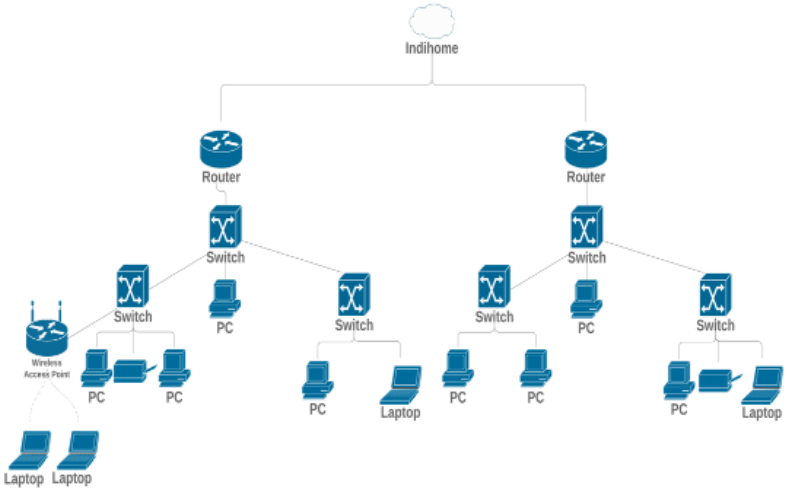

Fig 3. Proposed Network Scheme of Al-Basyariah Education Foundation

B. Initial Network Testing

In the initial network testing phase, it was carried out before the implementation of the PPTP Tunneling method on the proxy router, it can be seen that each user in each building cannot yet be connected.

Jurnal Teknik Informatika C.I.T Medicom, Vol. 12 No. 2, September (2020) p-ISSN 2337-8646 e-ISSN 2721-561X
Contents lists available at Publisher Institute of Computer Science (IOCS Publisher)
Jurnal Teknik Informatika C.I.T Medicom
journal homepage: www.medikom.iocspublisher.org/index.php/JTI

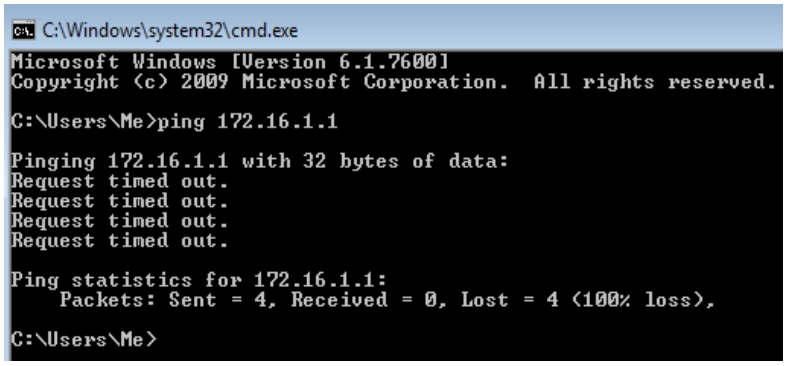

Fig 4. Test Ping of the main building (before)

The author performs a ping test on users in the branch building to users in the main building, it can be seen that Request Time Out or it can be called the network is not connected, so is the reverse test.

C. Final Network Testing

At this stage of network testing, the authors have applied the tunneling method to each proxy.

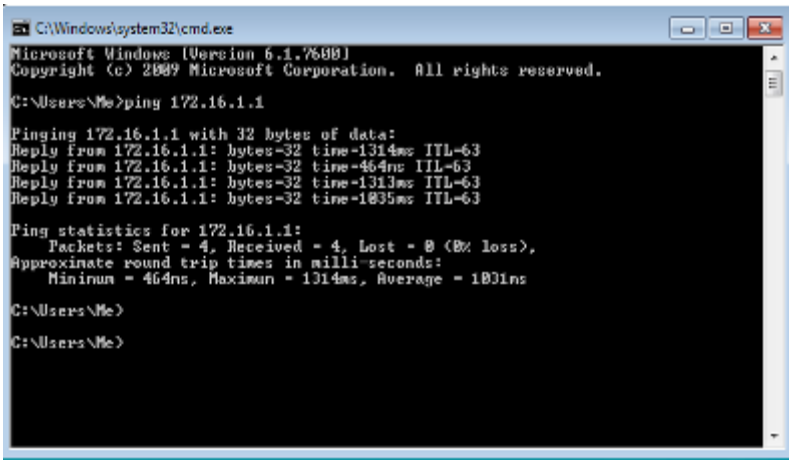

Fig 5. Branch building Ping test to main building (after)

The author performs a Ping Test on a user in a branch building to a user who is in the central office, it can be seen that there is communication or the network is connected. Then for the VPN network the author also performs a ping test, it can be seen that the ping request has been successfully replied, thus it can be concluded that the VPN network is running well and can communicate with internally the main building and branch buildings.

4. Conclusion

After analyzing computer networks at the Al-Basyariah Education Foundation, it can be concluded that:

1) The network system at the Al-Basyariah Education Foundation uses a tree topology and for internet needs using an ISP (Internet Service Provider) from Indihome.
2) To exchange data, the Al-Basyariah Education Foundation uses a flashdisk and email.
3) There is no connection between the main building and the branch building.
4) After the author proposes the tunneling protocol method PPTP (Point-To-Point Tunneling Protocol) the main building and branch buildings can be connected to each other. And for structured data exchange with the data center server.

5. References

[1] Pranoto, M. L., Studi, P., Komputer, T., Bandung, P. T., Riza, T. A., &Hamdani, B. (2016). Implementasi vpn dan proxy server menggunakan freebsd pada sma islam hidayatullah.

[2] Adian Fatchur Rochim, & Andrian Satria Martiyanto. (2011). Desain dan Implementasi Web Proxy dan VPN Akses (Studi Kasus di Undip). Jurnal Sistem Komputer, 1(1), 1–3. Retrieved from http://jsiskom.undip.ac.id/index.php/jsk/article/view/5/6

[3] VARIANTO, E., & MOHAMMAD BADRUL. (2015). Implementasi Virtual Private Network Dan Proxy Server Menggunakan Clear Os Pada Pt.Valdo International. Jurnal Teknik Komputer Amik Bsi, 1(1), 55–56.

[4] Supendar, H. (2016). Implementasi Remote Site Pada Virtual Private Network Berbasis Mikrotik. Bina Insani Ict Journal, 3(1), 85–98.

[5] Isador, A., & Sarana, B. (2016). Implementasi Failover Menggunakan Jaringan Vpn Dan Metronet Pada. Implementasi Failover Menggunakan Jaringan Vpn Dan Metronet Pada Astrindo Indonesia, (January 2015), 13.

[6] Yudianto, M. J. N. (2007). Jaringan Komputer Dan Pengertiannya. 1–10.

https://medikom.iocspublisher.org/index.php/JTI/article/view/34/22

Pusat Penelitian dan Pengabdian Masyarakat
STMIK Nusa Mandiri

SURAT TUGAS
052/B.01/PPPM-NM/IX/2020

Tentang

PENELITIAN YANG DIPUBLIKASIKAN DALAM JURNAL ILMIAH
Periode September 2020 - Februari 2021

Menulis pada Jurnal Mantik Vol. 4, No. 3, November 2020
(E-ISSN 2685-4236)

Judul :

Online Leave Information System Based on Website Case Study at Taman Mini Indonesia Indah

Menimbang :
1. Bahwa perlu diadakan pelaksanaan Tridharma Perguruan Tinggi dalam bentuk Penelitian.
2. untuk Keperluan pada butir 1 (satu) diatas, maka perlu dibentuk tugas yang berkaitan dengan penelitian yang dipublikasikan dalam Jurnal Ilmiah.

MEMUTUSKAN

Pertama : Menugaskan kepada saudara

Muhamad Ryansyah M.Kom

Sebagai Penulis yang mempublikasikan Penelitianya pada Jurnal Ilmiah.

Kedua : Mempunyai tugas sbb:
Melaksanakan Tugas yang diberikan dengan penuh rasa tanggung jawab.

Ketiga : Keputusan ini berlaku sejak tanggal ditetapkan, dengan ketentuan apabila dikemudian hari terdapat kekeliruan akan diubah dan diperbaiki sebagaimana mestinya

Jakarta,1 September 2020
Ketua PPPM
Sekolah Tinggi Manajemen Informatika dan Komputer Nusa Mandiri

Norma Yamita, M.Kom

Tembusan
- Ketua Sekolah Tinggi Manajemen Informatika dan Komputer Nusa Mandiri
- Arsip
- Ybs

Jurnal Mantik
Volume 4, Number 3, November 2020, pp. 1397-1403 E-ISSN 2685-4236
https://iocscience.org/ejournal/index.php/mantik

Online Leave Information System Based on Website Case Study at Taman Mini Indonesia Indah

[1]Herman Kuswanto, [2]Agus Mukti Sukarno, [3]Muhamad Ryansyah

[1,2]Technical Information
[3]Information Systems
[1,2,3]STMIK Nusamandiri Jakarta, Jln Jatiwaringin Raya No.02 Rt.08 Rw.013 Kelurahan Cipinang Melayu Kecamatan Makasar Jakarta Timur 13620

E-mail:
herman.hko@nusamandiri.ac.id[1],agusmukt2708@nusamandiri.ac.id[2],muhamad.mur@nusamandiri.ac.id[3]

ARTICLE INFO

Article history:
Received: 12/07/2020
Revised: 22/08/2020
Accepted: 30/09/2020

Keywords:
Design of Information System, Purchase Process of Material, Waterfall

ABSTRACT

Along with the era development and the increasingly advanced technology, demanded speed and accuracy in obtaining information. The use of computers and Sistem-sistemnya has become a major necessity to facilitate human work. Taman Mini Indonesia Indah is an Indonesian culture-themed tourist park in East Jakarta. Leave is one of the employees ' rights. Leave can be used by employees to not be able to enter the work for a particular reason, e.g. refreshing, sick break, childbirth, performing religious obligations, and other purposes in accordance with the provisions of the leave of each organization/agency. Processing of leave data at Taman Mini Indonesia Indah is still done manually by using the leave paper to HRD which resulted in the approval process and the report has not been efficient. With the online website-based and make with method waterfall leave submission system, make it easier for employees to apply for leave and generate fast, precise and accurate data for HRD in obtaining and making employee leave reports

1. Introduction

Taman Mini Indonesia Indah (TMII) is a tourist park with the theme of Indonesian culture in East Jakarta. An area of approximately 150 hectares or 1.5 square kilometers is located at the coordinates of 6 degrees 18'6.8"LS, 106 degrees 53'47.2"E. In Indonesia, almost every ethnic group has different building shapes and styles, and it is not uncommon for one ethnic group to have more than one type of traditional building.

Leave is one of the rights of employees. Leave can be used by employees to be unable to come to work for certain reasons, for example refreshing, taking sick breaks, giving birth, fulfilling religious obligations, and other requirements in accordance with the provisions of leave in each organization / agency.[1]

At Taman Mini Indonesia Indah, for filing employee leave, and making employee leave reports still use paper and Microsoft Excel, where processing like this is less effective for storing employee leave data, because employee leave data storage is still stored in filing and Microsoft Excel.

The problem that arises is the difficulty in processing leave data due to manual processing of leave data, sometimes human errors occur, because recording is sometimes done improperly. Another problem that arises is that the preparation of annual leave reports requires a long time and requires large storage space.

According to Fattah concludes that: An information system is a system within an organization that brings together the needs of daily transaction processing, supports certain operations with the required reports. Information system design is the development of a new system from the old system, where the problems that occur in the old system are expected to be resolved in the new system.[2]

The web is a collection of pages used to display text information, still or motion images, animation, sound, and / or a combination of all of them, both static and dynamic which form one a series of interconnected buildings, each linked by a network of courtyards

To make it easier for employees to carry out the leave process and get complete and detailed information related to leave.[3] So the authors are interested in creating a system to solve the problems at Taman Mini Indonesia Indah.

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

The design of this information system is web-based to present information on attendance data processing and taking leave from work in the industry using PHP and MySQL programming. The purpose of this system is to design, manage and implement work leave takers at the company. This information system design uses data flow diagram modeling, relation diagrams. The implementation of this information system is intended to make the process of obtaining leave work permits more effective and efficient. This system is based on HTML 5 programming, so it can be accessed using a browser device.[4]

The processes and procedures for managing employee leave of most companies still use manual methods. From the leave application process, information on the remaining leave and approval of leave submissions is still carried out based on filling in data using paper or cards available at each company. This usually results in the process of applying for leave that is quite long and long so that employees cannot use time management properly. In this research, a website-based employee leave information system design will be built.[5]

2. Method

In information system development, using the waterfall method. According to Kristanto in (Alfatah, 2018) Waterfall is "a simple classic model with a linear system flow, the output of each stage is the input for the next stage". [6]

a) System Requirements Analysis
   At this stage, an analysis of the documents needed to design a leave application system is carried out at Taman Mini Indonesia Indah. These documents include: A leave application form approved by HRD Taman Mini Indonesia Indah.
b) Design
   This stage is done before coding. This stage aims to provide an idea of what should be done and how it should look. This stage focuses on the database design by describing the design of the ERD (Entity Relationship Diagram) diagram, LRS (Logical Record Structure) and also the file specifications, software architecture. Using UML (Unified Modeling Language) and designing the interface design.
c) Code Generation
   Translating the design into a form that can be understood by machines. At this stage in making the employee leave information system at Taman Mini Indonesia Indah, it uses structured programming with the programming language used PHP and the mysql database.
d) Testing
   At this stage, the authors test the system by testing using the blackbox testing method. The aim is to find problems at the beginning both in system function, system logic, database access and interfaces. Where in the test the main focus is to ensure all functionalities and system interfaces run properly and in accordance with needs. And in terms of the employee leave transaction process, it must be calculated correctly and accurately, this is to solve problems that exist when using manuals
e) Support
   In developing the system, the author seeks to create a flexible application so that if there is a change in regulations regarding leave, the user can immediately make the changes independently. However, if time goes by, there are changes to forms or application interfaces from the previous one, then this must be adjusted in the application. At the system development stage the author uses hardware specifications with 2 gigabytes of RAM and a hard disk capacity of 500 gigabytes while the software used by PHP and MySql with the Xampp web server, for interface design uses Notepad ++ and the operating system used is Windows 8 Pro.

3. Result and Discussion

Online Leave Information System at Taman Mini Indonesia Indah which makes it easier for submissions to find out the remaining employee leave.

a) Business Modeling
1) Employee Access:
   A1. Employees can log in
   A2. Employees can access the leave application menu
   A3. Employees can access the leave application history menu
   A4. Employees can log out
2) Access HRD Administrator:
   B1. HRD can login
   B2. HRD can manage employee data

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

B3. HRD can manage job data
B4. HRD can manage location data
B5. HRD can manage status data
B6. HRD can manage leave data
B7. HRD can access leave approval
B8. HRD can access the leave application flow
B9. HRD can access the report menu
B10. HRD can log out

3) Access Manager:
C1. Manager can login
C2. Manager can create users
C3. Manager can access reports
C4 Manager can log out

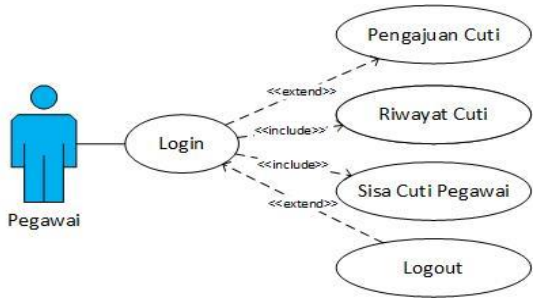

Fig 1. Employee Use Case Diagram

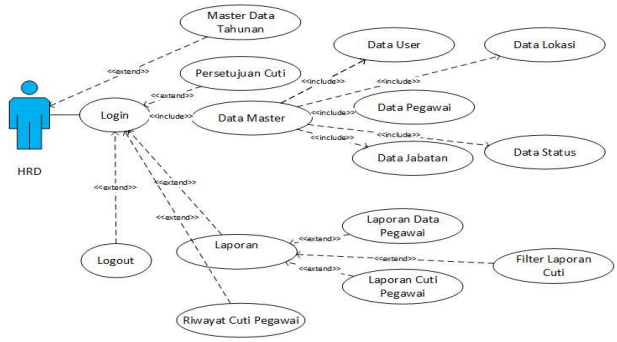

Fig 2. HRD Use Case Diagram

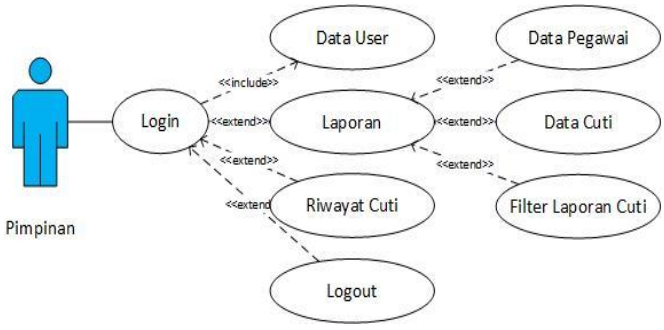

Fig 3. Manager Use Case Diagram

3.1. Data Modeling

The following is data modeling from the online leave system. At this stage the author identifies the attributes of each object and defines the relationship between these objects into a set of data objects in the database, which in this design the author uses an Entity Relationship Diagram (ERD) and also a Logical Relation Structure (LRS).

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

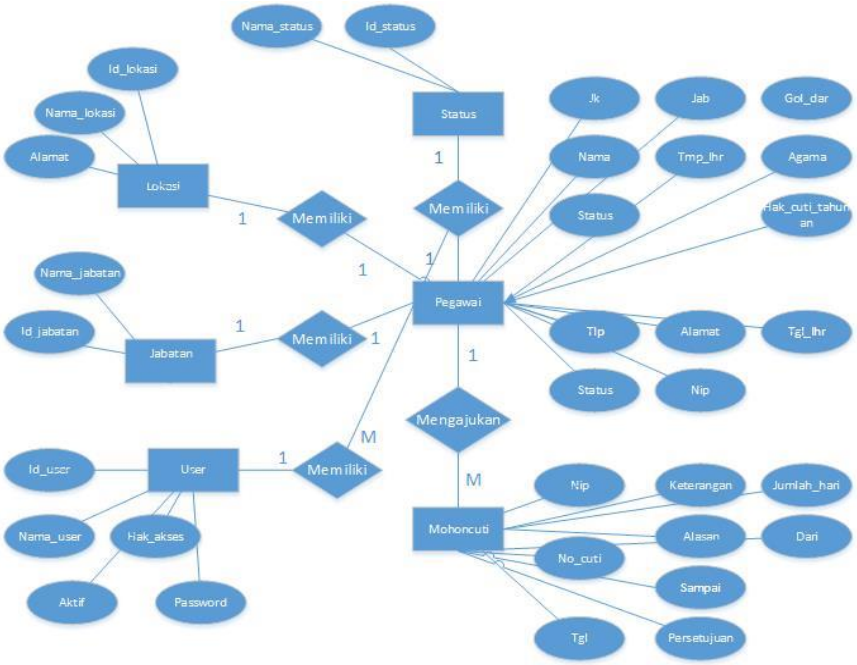

Fig 4. Entity Relationship Diagram

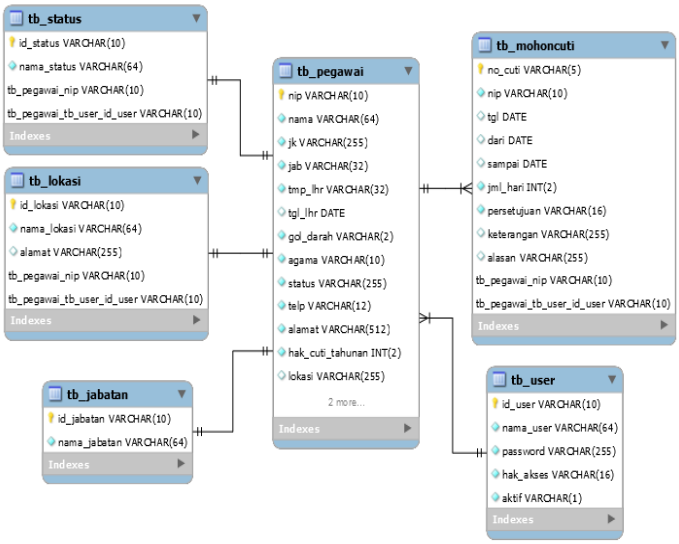

Fig 5. Logical Relation Structure

3.2. Process Modeling

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

The following is a process modeling of the online leave system. At this stage the authors transform what has been defined in data modeling and then implemented using an Activity Diagram.

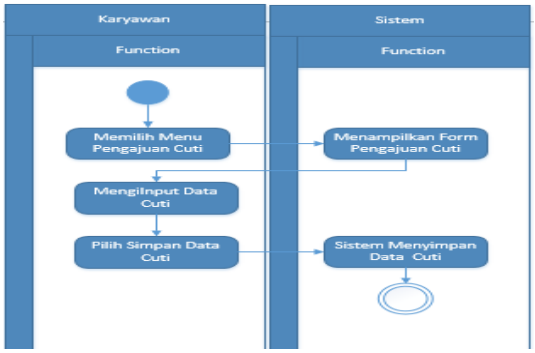

Fig 6. Leave Request Activity Diagram

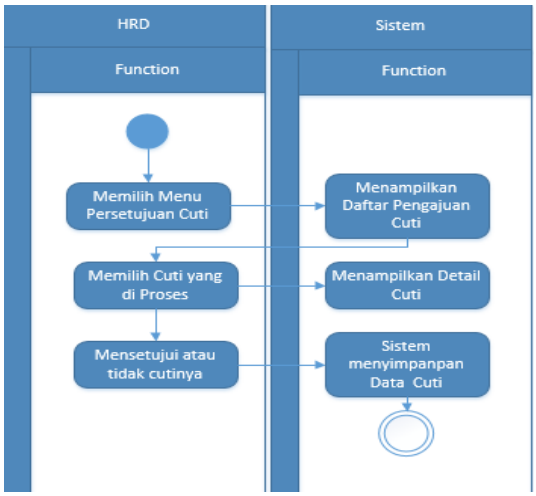

Fig 7. Activity Diagram for Leave approval

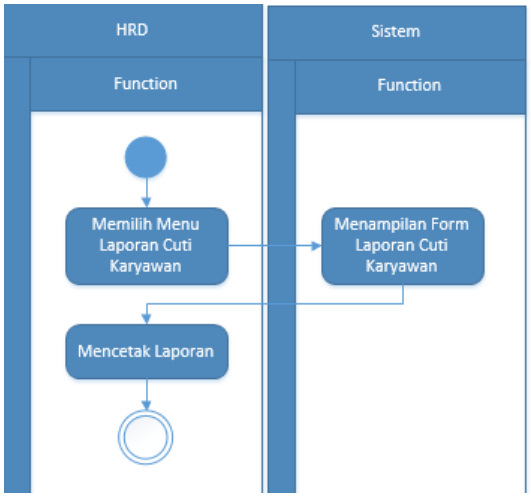

Fig 8. Activity Diagram prints leave reports

3.3 Web Design

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

At the stage of making the application the author applies a number of program code from the results of the analysis of the running system at the school that has been researched into a structured program using PHP tools. The following is the making of an application that is built on a web basis, and displays some application development designs including:

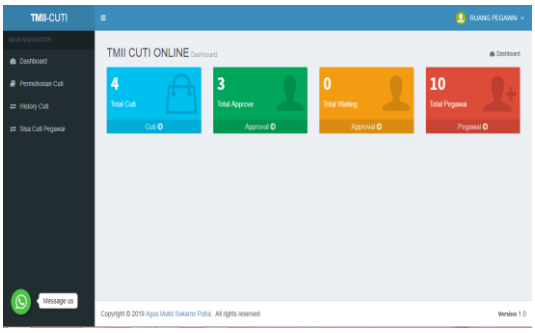

Fig 9. Employee User Interface

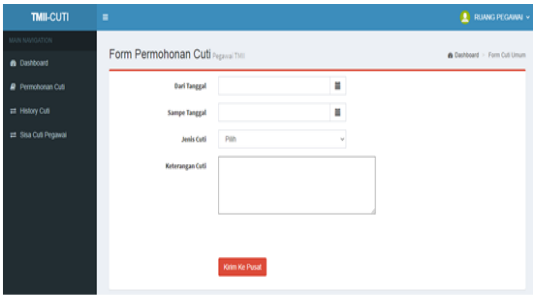

Fig 10. Leave Request User Interface

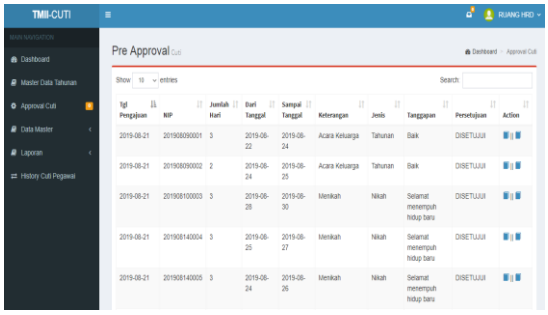

Fig 11. Leave Approval User Interface

3.4. Examination

In the testing and replacement phase, the author tests all interfaces that have been made using the Black Box method.

Table 1.
Black Box Testing Leave Request Results

No	Sekenario Pengujian	*Test Case*	Hasil yang diharapkan	Hasil Pengujian	Kesimpulan
1.	Mengosongkan semua data pengajuan cuti lalu mengklik tombol "Kirim ke Pusat"	Semua data atau *field* kosong	Sistem menolak dan menampilkan pesan "Harap periksa kembali dan pastikan data yang Anda masukan lengkap dan benar."	Sesuai Harapan	Valid
2.	Mengosongkan data "dari tanggal dan sampai tanggal	Data tanggal kosong	Sistem akan menolak dan menampilkan pesan "Harap periksa	Sesuai Harapan	Valid

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

No	Sekenario Pengujian	*Test Case*	Hasil yang diharapkan	Hasil Pengujian	Kesimpulan
			kembali dan pastikan data yang Anda masukan lengkap dan benar."		
3.	Tidak memilih jenis cuti yang akan diambil, lalu klik "Kirim ke Pusat"	Tidak pilih jenis cuti	Sistem akan menolak dan menampilkan pesan "Harap periksa kembali dan pastikan data yang Anda masukan lengkap dan benar."	Sesuai Harapan	Valid
4.	Menigisi semua data dengan benar, lalu klik "Kirim ke Pusat"	Mengisi semua data	Sistem akan menyimpan permohonan cuti dan menampilkan pesan "permohonan cuti terkirim"	Sesuai Harapan	Valid

Table 2.
Black Box Testing Results Leave Report

No	Sekenario Pengujian	*Test Case*	Hasil yang diharapkan	Hasil Pengujian	Kesimpulan
1.	Mengosongkan semua data laporan cuti	Semua data atau *field* kosong	Sistem tidak menampilkan data laporan	Sesuai Harapan	Valid
2.	Mengosongkan beberapa data laporan cuti	Mengosongan beberapa data	Sistem tidak menampilkan data laporan	Sesuai Harapan	Valid
3.	Mengisi semua data laporan cuti	Data laporan tidak sesuai jenis atau tahun	Sistem tidak menampilkan data laporan	Sesuai Harapan	Valid
4.	Mengisi semua data laporan cuti	Data laporan sesuai jenis dan tahun	Sistem menampilkan data laporan	Sesuai Harapan	Valid

4. Conclusion

In building the TMII online leave system website, the authors conclude that the leave information system that previously used the manual method, which is done by employees must come directly to take leave TMII's online leave information system can be accessed via the internet making it easier for anyone, anytime and anywhere. Just accessed it TMII's online leave information system accelerates the processing of employee data, employee leave data and the process of making reports, so that the time needed is shorter and more efficient.

5. References

[1] Maimunah, M., Singgih, S., & Supriyadi, A. (2017). RANCANG BANGUN SISTEM SMS GATEWAY SEBAGAI FASILITAS PERMOHONAN CUTI KARYAWAN. Journal CERITA, 3(1), 36-48. https://doi.org/https://doi.org/10.33050/cerita.v3i1.616

[2] Nugroho, C., Dwi, P., Pamungkas, A., Studi, P., Informatika, T., & Panjang, R. (2017). Sistem informasi employee self services departemen hrd-ga pada pt century batteries indonesia jakarta. 3(1), 235–241.

[3] Syaripudin, G. A., & Cahyana, R. (2015). PENGEMBANGAN APLIKASI WEB UNTUK PENGAJUAN CUTI PEGAWAI SECARA ONLINE Gandana. 13(2302–7339), 1–8.

[4] Setyabudhi, A. L. (2017). Perancangan Sistem Informasi Pengolahan Data Absensi dan Pengambilan Surat Cuti Kerja Berbasis Web. JR (Jurnal Responsive), 1(1), 11–22. https://doi.org/9786020271705

[5] Ayu, I. G., & Saryanti, D. (2018). Perancangan Sistem Informasi Cuti Karyawan Berbasis Website Menggunakan Framework Laravel. 374–381.

[6] Alfatah, M. (2018). Sistem Informasi Kepegawaian Berbasis Website. 1(1), 18–26

https://iocscience.org/ejournal/index.php/mantik/article/download/944/650/2444