

## Development of Lan Network Infrastructure on Highways Department of Public Works South Sumatra Province

**Devi Rianti, Firdaus, Syahril Rizal**

Master of Information Technology  
Bina Darma University  
e-mail: The\_purplelover@yahoo.co.id

### ***Abstract***

*The purpose of this research is to develop a network LAN infrastructure at the Department of Public Works Highways South Sumatra Province, to determine the need to use and analyze the information that the user needs, provide solutions and alternatives to increased use of local networks, local networks in designing development at Department of Public Works Highways South Sumatra Province, generating a network system that quickly and accurately at all times in accordance with the needs of users in getting information. In this research using primary data and secondary data. Primary data were obtained by direct observation in the work environment of Department of Public Works Highways South Sumatra Province. This research includes applied research using quantitative and qualitative approaches. From the data analysis of the variables studied were documentation related to the development of network infrastructure LAN system on Department of Public Works Highways South Sumatra Province, the results of the comparison before and after the development of network evaluation of network development. Methods for gathering research data using the techniques of data collection interviews, observation and study of literature. The research instrument used in collecting the data is observational guidelines.*

**Keywords :** *Development, Network Infrastructure, LAN*

### **1 INTRODUCTION**

The ability to access and provide information quickly and accurately is very important for an organization, either in the form of a commercial organization (company), universities, government agencies and individuals. All this can be easily done in line with the rapid development of technology, especially in the field of computer technology and telecommunications.

Computers are evolving from a means of processing the data into a stand-alone communication between computers with different variations of the network, such as a Local Area Network (LAN), Metropolitan Area Network (MAN), and Wide Area Network (WAN). By connecting computers within a network of data and information transfer from one place to another can be done easily and quickly. Speed is the long time required for processing the data

into information according to user needs, obtained by the old measurement data processing up to the release of information.

Department of Public Works Highways South Sumatra province has used local data communication system or a LAN (Local Area Network) in each division at the Ministry of Public Works Highways parts of South Sumatra Province. LAN (Local Area Network) is one of the development of information technology by connecting two or more computers together closely related to the activities of the organization.

The problems that exist in the province of South Sumatra DPU Highways are:

1. Access rights management and bandwidth management that is not in accordance with user needs.
2. The lack of use of the network manager so that the utilization of the LAN infrastructure is not maximal.

Based on observations by the author, it can be stated problems faced. And of the problems that have no decision point is obtained:

1. The process of limiting access rights are granted according to user needs.
2. HR master the technology section of Administration and Administration for ease of work and improving work quality.
3. Supporting facilities (computer) Administration and Administration section, equipped with a computer network security system.

The purpose of this study is set as follows:

1. Knowing the needs of the information used in the DPU Highways South Sumatra Province.
2. Analyze user needs to DPU Highways South Sumatra Province.
3. Provide solutions and alternatives to the increased use of local networks in South Sumatra Provincial Highways DPU.
4. Creating the design or blueprint for the network infrastructure.
5. Creating new LAN network that can relate to all parts.
6. Generate network system that quickly and accurately at all times in accordance with the needs of users in getting information.
7. Comparing the results of the assessment system is a LAN (Local Area Network) in South Sumatra Provincial Highways DPU before and after development.

## 1.1 Computer Networking

The computer network is a system that consists of computers and other network devices that work together to achieve a common goal. In order to achieve the same purpose, every piece of computer network request and provide the service (service)'. (Daryanti : 2010).

Computer networks can be defined as a system that consists of computers and other devices together to form a network can communicate with each other in order to exchange data and resources. (Iwan : 20110).

## 1.2 Network Infrastructure

According to the dictionary of Indonesian , Infrastructure can be defined as public facilities and infrastructure . Meanwhile , a network interconnect ( inter- connectedness ) between one or more computers that can exchange data through a medium of instruction and so on.

## 1.3 Hotspot

A hotspot is an area / location served by a limited set of Access Point or Wireless LAN standard 802.11 a / b / g / n where the user can enter into a network access point and a mobile freely use similar devices notebooks , laptops , PDAs and the like without using a wired connection .( Purbo : 2006).

## 1.4 IP Version 4 and Subnetting

IP version 4 ( IPv4 ) is a type of network that is used as the network protocol TCP / IP . Long version 4 IP address is 32 bits and theoretically can put up to 4 billion or more host computers around the world . IP address is divided into two parts, namely the network address and node / host address . IPv4 consist of 5 classes , namely A , B , C , D , E. Of the five classes are commonly used on the network is class A , B and C. While the class D and E , respectively used for multicasting and research

## 1.5 IP Version 6

IP version 6 ( IPv6 ) is a new version of the Internet Protocol that is designed as a replacement of the Internet Protocol version 4 ( IPv4 ), which is defined in RFC 791 . IPv6 address that has a huge capacity ( 128 bits ) , support the preparation of a structured address , which allows the Internet continues to grow and provide new routing capabilities not found in IPv4 . IPv6 anycast address has a type that can be used to efficiently route selection . Additionally IPv6 is also complemented by mechanisms use the address locally that enable the realization of the installation is Plug & Play , as well as providing a platform for a new way of usage of the Internet, such as support for data flow in real -time , the selection of the provider , host mobility , end-to - end security , or automatic configuration.

## 1.6 Framework

The framework is designed to solve research problems encountered in the study. Based on the identification of the problems outlined in the previous section that this research aims to develop a network LAN infrastructure at the Department of Public Works Highways South Sumatra Province. Research arrayed in the process of collecting data by interview, observation, documentation and literature as well as the end result is a design that is desired.

## 2 RESEARCH METHODOLOGY

In his opinion (2008 : 244 ) the development of a system includes the analysis , design , implementation and testing . The research method is a sequence or steps that must be performed in the completion of the study , so that the final goal of this research is the LAN Infrastructure Network Development at the Department of Public Works Highways South Sumatra Province can be achieved with either . The method used by the authors in this

study are :

## **2.1 Literature**

The study of literature is a method of collecting data or documents obtained in the literature . Documents can include books theory , the results of previous research , the Internet or specialized institutions that provide various sources of literature relevant to the issues to be studied . ( Sangadji & Sopiah : 2010)

## **2.2 Network analysis**

Network analysis was conducted to determine the weaknesses of the problems with the computer network system to test the theoretical issues raised in order to analyze whether the techniques used to produce the desired solution.

## **2.3 Draft Network**

Creating the design to prove that the results of theoretical analysis that has been done can actually work as expected.

## **2.4 Network Design Method**

Network design method used in this study refers to the process model development network called Network Development Life Cycle ( NDLC ) . NDLC measures can be categorized as follows ( Oppenheimer 2004 ) :

1. Needs Analysis Network
2. Logic Design Network
3. Physical Design Network
4. Implementation
5. Maintenance ( Optimization , Monitor and Management )

## **3 RESULTS AND DISCUSSION**

### **3.1 Initial Conditions**

Results from data collection through direct observation and documents will be described in detail in Table 1 of the description of the initial state in the analysis and LAN network at the Department of Public Works Highways South Sumatra.

### **3.2 Needs List**

In analyzing the development of a network, the first thing to be done is to analyze the needs (requirements analysis) that is tailored to the needs of users, applications and devices.

Table 1: Table of Initial Condition Design Network

ITEM	DESCRIPTION
Project Type	Design Network Infrastructure LAN
Project Scope	3 Floors, +17 Space, the user covers the entire internal employee DPU Highways South Sumatra Province.
Project Objectives	Improve network performance for all users, add the increase of network services and applications as well as extending the reach of the network.
Other Condition	Cost are not yet available.

Table 2: Table of User Requirements

TYPE	DESCRIPTION
User Distribution	Head Office, Secretary, Head, Head, Permanent Employees, Employees Honor. (Employees Remain 684 people, 220 people Honor Employee)
Activities are often carried out	1. Access the Internet using a web browser application, email, and search engines. 2. Using multimedia applications music and video player. 3. Office work using office applications, acrobat reader.
Technical Level Users	Nearly +80% users can use office applications, internet applications and multimedia well. +20% More technical understanding of computer networks.
Factors Security	System security and confidentiality has not been the focus of major concern. On the use of anti-virus is not equitable and effective in users.
Carrying Capacity	Highways DPU South Sumatra Province will support the development of IT networks in the internal environment in the use of computers and their applications optimally.

### 3.2.1 User Needs

Users DPU Highways network in South Sumatra province include Permanent Employees and Employees of Honor / Daily. Habits of network users can be described in the following Table 2.

### 3.2.2 Application Requirements

Applications are frequently and commonly used in the South Sumatra Province of Highways DPU is office applications, internet applications, multimedia applications as well as special applications such as Auto Cad 2D & 3D.

For development needs, needed some other application that is needed to support quality improvement work in the use of IT in the internal environment of South Sumatra Province of Highways DPU. The following applications will be applied to the DPU Highways of South Sumatra Province, Show in Table 3.

### 3.3 Network Devices

This section will describe the required device from the analysis of the existing system, the LAN infrastructure network design and requirements of the design. To support the architecture, the network topology has been described previously, it is necessary that network devices meet these specifications. Network devices are used DPU Highways South Sumatra

Table 3: Table of Application Requirements

TYPE OF APPLICATION	DESCRIPTION
Operating System	Operating System Free and Licensed
Office Applications	Applications Office, Word Processor Database Applications
Multimedia applications	Applications Music Players Application Video Player Image Processing Applications, Voice and Video
Internet Applications	Web Browser Application Applications E-mail Net Application Support, Chat, Messenger. VoIP Applications
Local Application Server	DNS Server Web Server Webmail Server File Server
Special Application	Application Design of AutoCad 2D & 3D

Province is as follows:

1. Server is used has an Intel Core i3 specification 3.0 Ghz, 4GB RAM, 500GB HDD.
2. The Cisco Router and PCs function as a router mikrotik web proxy and user authentication hotspots in South Sumatra Province of Highways DPU.
3. Switches are used Baseline Switch 8 Port 02.
4. Wireless Access Point.
5. Speedy modem used to connect to two lanes with a capacity of 2 Mbps Speedy Unlimited.

## References

- Badrul, A., (2012), *Computer Network Engineering*. Jakarta : Inti Prima.
- Budi, R., (2011), *Introduction to Computer Networking*. Tangerang : crypt.
- Daryanto, (2010), *Technology Internet Network*. New York: The Nusa.
- Doherty, J., et al., (2008), *Cisco Networking Simplified*. Indiana Polis : Cisco Press IN.
- Fahtoni, A., (2008), *Research Methodology & Engineering Thesis Preparation*. Jakarta : Rineka Reserved.
- Hasan, I., (2008), *Principles of Statistics material*. Jakarta : PT.Earth Literacy.
- Jogiyanto, H.M., (2005), *Basic Computer Science , Programming , Information Systems and Artificial Intelligence*. London: Andi Offset.

- Kadir, A., Triwahyuni, C.T., (2003), *Introduction to Information Systems*. London: Andi Offset.
- Markus, H.M., Beaumont, L., (2005), *Content Networking Architecture , Protocols and Practice*. San Francisco, CA : Morgan Kaufmann Publishers.
- Oppenheimer, P., (2004), *Top - Down Network Design*. Indiana Polis : Cisco Press, IN.
- Sarwono, J., (2006), *Research Data Analysis Using SPSS 13*. London: Andi Offset.
- Sofana, I., (2010), *Cisco CCNA & Computer Network*. New York : Informatics.
- Sugeng, W., (2006), *Computer Networks with TCP / IP*. New York: Informatics.
- Tannebaum, A., (2003), *Computer Networks*, 4 th Ed. New Jersey : Prentice Hall, Inc.