Design of Load Balancing Using Static Route Address List Method In The Case Study of Tambakrejo Village Tulungagung

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ABSTRACT

The Internet plays a very important role in this day and age, both for the search for information and knowledge. In the development of internet network many factors affect it, such as the geographical location of the area, supporting facilities such as signal towers, construction costs, as well as Internet Service Providers (ISP) that cover the area. The purpose of this study is to build an internet network in Tambakrejo village, whose has very difficult internet access due to its geographical location which is very far from the city and very few supporting facilities in the construction of internet networks, so the authors developed a solution using devices such as the Router, hubs, and using a load balancing method to stabilize the load of activities of all connected devices. The final result expected by the authors in this study is so that people who live in the Tambakrejo village of Tulungagung city can feel internet access that is easier and more stable, and the construction of their internet network does not cost much. 

Keywords  
Internet, Load Balancing, Static Route.

1. Introduction

Because in this day and age the internet is very important, both to find information, and knowledge. Many people have used the internet in their daily activities. Internet usage in East Java alone reached about 13.5% (APJII, 2018). In the construction of an internet network many factors can affect it, such as connection speed and development costs. Both are closely related to the issue of material effectiveness and time. Because of the lack of internet access in villages where the area is difficult to reach. Due to the limitations of tools and geographical barriers, therefore the construction of internet network infrastructure in the village becomes difficult to build starting from a long time and very expensive costs.

In this study, the author build a simple internet network infrastructure using mikrotik in tambakrejo village in Tulungagung, whose internet access is currently still very difficult. So that tambakrejo villagers can easily access the Internet. With the use of the Load balancing method in this study, so that connections can share and cover each other in case of interference in one of the ISP to be used.
2. Research Method

1. Study of literature

At this stage there are two stages in the literature study, the first stage is to compare each of the previous research journals. Journals that the author uses as a reference include:

Research conducted by Nurul Fadilah and Zamzami. Based on the results of the case studies discussed by the authors, the result of design and testing at the internet cafe on the performance of a proxy-based multihomed gateway using the combined load balancing and failover method proves that the gateways of the two ISP are successfully separated based on the needs of a local or international bandwidth [4].

Research conducted by Muhammad Dedy Haryanto, Imam Riadi. Authors succeeded in dividing the path in a balanced way between the main bandwidth and the spare bandwidth[5]. The second stage is to collect data to build the system to the next stage.

2. Analysis Stage

At this stage the researcher conducts a needs analysis and designs the designs needed to support the development of the system to be made. This analysis starts from the software and hardware requirements needed to build this system. In addition, at this stage, researcher design a design in order to provide an overview of the system to be made.

3. System Development

The tools used in this research include sufficient software and hardware to configure and analyses the system to be made. These specifications include:

| Device         | Specification                        |
|----------------|--------------------------------------|
| Laptop         | Processor : Inter® Celeron® N2840     |
|                | @ 2.16Hz 2.16GHz                      |
|                | Memory : 2 GB                         |
|                | Harddisk : 500 GB                     |
| UTP Cable      | straight and crossover cables         |
| Mikrotik Router| Series : Rb450G & Rb750               |
| Board          | RouterOS L4: Level 4                  |

Table 2. Software devices

| Device          | Specification |
|-----------------|---------------|
| Operation system| Windows 10 Pro|
| Remote Router   | Winbox        |
4. Network Topology Design

In the topology design, each network device will be assigned an IP address and configured as needed. Starting from setting the mikrotik so that it can be used as a network monitoring place, then setting the IP to connect the city network to the Tambakrejo village Testing Phase.

5. System testing

In the last stage before making a report about the whole system and trying the system in each of the requirements that have been determined from the beginning and trying to decide on one of the ISP networks to test whether the failover technique has been successfully applied and try whether the internet can be used or not in that area[ 6].

3. Results And Discussion

This chapter describes the implementation that was made after building the network. Hardware implementation includes display of settings used on mikrotik.

1. Topology Used

![Figure 1. Topology used](image)

The following is an image of the topology that authors will use to solve this problem and here is how to set up Mikrotik:
Setting Mikrotik Routerboard

At this stage the author will present the results of the settings from the MikroTk to connect the internet to the Tambakrejo village. Starting from setting the IP address and mangle with the following steps:

1.1. Setting IP address

Figure 2 describes the IP settings with the following steps:

First select the IP menu and then select the address sub menu. Then exit the Address List window and select the add option to issue a new window with the contents of the IP address, network, interface. In the first IP address, the researcher uses interface 1 to connect the proxy with ISP 1 which uses the IP 192.168.1.1. Then the researcher entered the IP Address 192.168.1.2 with the 192.168.1.0 network to connect to ISP 1. Then select OK so that the IP on ether1 is stored. After setting the IP on ether1, the researcher set the IP on ether2 with an IP address of 192.168.100.2 with a network of 192.168.100.0 to connect to the ISP 2. Then after the authors made settings on ether1 and ether2 the authors made settings on ether3 to connect the proxy with a switch with IP 192.168.10.1 with network 192.168.10.0.
1.2. DNS settings

![DNS Toolbox](image)

In this sub-chapter, the researcher explains how to set DNS on the proxy located in the city. The first step is to select the IP menu and then select the DNS sub-menu. In this study the author uses a DNS server from google, namely 8.8.8.8 then select apply and OK

1.3. NAT Configuration

![NAT Toolbox](image)

In this sub-chapter, the researcher explains how to set NAT on Mikrotik
Figure 6. MNC ISP results

From Figure 5 to Figure 6 explain the results of devices connected to the internet network that the authors made.

Conclusion

Result of this study by the authors above, it can be concluded that the internet network built using the static route address list method can help villages that have difficulty getting internet access to get access with easy and affordable methods.

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