Load balancing factor using greedy algorithm in the routing protocol for improving internet access

Ady Satria, Poltak Sihombing, Sawaluddin

[1]Informatics Engineering Study Program Magister, Faculty of Computer Science and Information Technology, University of Sumatera Utara

Email: satria@uma.ac.id, poltakhombing@yahoo.com, sawal@usu.ac.id

Abstract. Load Balancing is very well applied to the distribution of internet access at any point of the Wi-Fi area so that the use of limited devices can be optimal and on target. The proper use of the Greedy Algorithms when applied to an access point device is very capable in resolving excessive loading in a single resource to take the best choice at every stage in an optimum process. Access point device is also a success factor in running the optimization of the distribution of Wi-Fi access on the Access Point is strongly influenced by the parameters set. In this research, user access factor in one very high Wi-Fi area also influences the possibility of incoming access failure. For the application of the results of this study can be utilized on all access point devices that have limits, but for speed internet access remains at the capacity provided bandwidth.

1. Introduction

In the case of the shortest path that can be solved by several algorithms is war shall algorithm, greedy algorithm, and bellman algorithm. The shortest paths are also some obstacles that can be solved in the presence of forbidden paths. In the greedy trajectory algorithm there is a G-weighted graph, s and t, and the set X as the forbidden path in G, in search of the shortest path P to no path passage of P containing X path P and permitted to repeat each vertex and its edges [1].

One of the mechanisms for dividing computational loads to multiple servers is called Load Balancing. Load Balancing serves to optimize resources, minimize time response, and avoid overloading in resources. Because computing resources can also reduce the destruction of services as resources can replace each other [2]).

The routing classful protocol does not carry the subnet mask information in its routing table. RIP version 1 (Routing Information Protocol) is a classful routing protocol, this is the first routing protocol that is widely used on the internet in networks. RIP is useful for local and medium size networks. RIP is known as the distance vector routing protocol, which functions in hop calculation as a routing metric, RIP allows 15 maximum number of hop no. The 16th hop count is considered an infinite distance that looks at distances such as routes that cannot be reached and roads that will not be carried out in the routing process. RIP operates a limited network size [3].

2. Formulation of the problem

Based on the background described, the problem that must be solved is the distribution of Wi-Fi access on an access point device for all users to be used in a balanced and equitable manner so that internet facility with bandwidth can be allocated optimally by looking at the

load balancing factor using the greedy algorithm in Wi-Fi access-based protocol routing classfull find strategies in operating a limited network size with optimum results.

3. Research methods

The research was conducted on campus of University of Medan Area by doing an observation to get the accuracy of information and data of internet access user at one point of Wi-Fi network on an access point device with user restriction.

Observations are also conducted thoroughly on the distribution of bandwidth provided from the main server to all available Wi-Fi networks in each access point so that the data obtained can later become input material to solve the problems contained in each available Wi-Fi network. The flowchart of research for Wi-Fi access on an Access Point can be seen as follows:

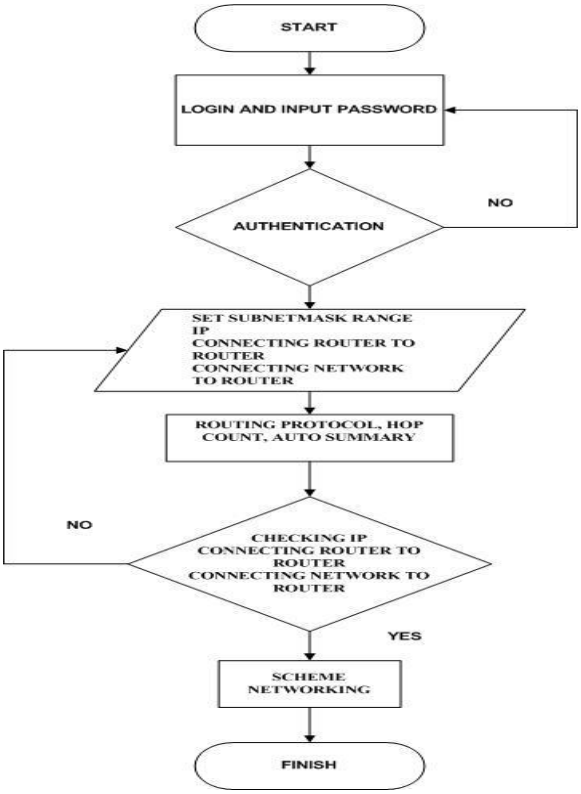

Figure 1. Flowchart Wi-Fi Access

Basically testing is done is concentrated only at one point of hotspot area only in the area that many users access the internet so that the results of Load Balancing can be seen accurately and precisely targeted. The author tested using ASUS RT Access Point Kit N12HP. This device is only able to serve access to the internet as much as 25 (twenty-five) users only. While supporting applications to perform testing is by using Winbox Mikrotic utility version 3.13 which serves to remote to Access Point ASUS RT N12HP devices in GUI mode (Graphical User Interface). So with the GUI mode it will be easier to perform monitoring and manage the bandwidth usage that is accessed by the user (user) internet in a hotspot area.

The use of the greedy algorithm in this test is to optimize internet access for limited Access Point capacity can be optimized so that internet users in the hotspot area more targeted and sustainable. In this test result whether load balancing factor using the greedy algorithm in Wi-Fi access based protocol routing classful with limited network size able to run optimally and efficient will be presented next.

4. Result and discussion

In testing is done by changing the structure of internet access (login) on hotspots that are already available on the router features Mikrotic using HTML programming language which is the default program on Mikrotic router that will be redirected to the login page (login) for the process of authentication user.

In the test in this study was conducted into four stages of testing access entry (login), testing of access point devices, testing the duration of internet usage and testing for 30 users of internet access users.

a. Testing Access Login (Login)

At this stage of access testing is done by using a web-based interface with HTML programming. The Greedy algorithm is applied here to change the access structure (login) of the internet on the hotspot as the main access point of the user to be able to access the internet.

Figure 2. Interface display user access internet access

b. Access Point Testing Tool

The device used is access point ASUS RT N12HP with limited capacity for only 25 (twenty) users only. Testing is done to ensure that the device used can receive a command from the router Mikrotic access log distribution to the Access Point device can run according to the remote is done.

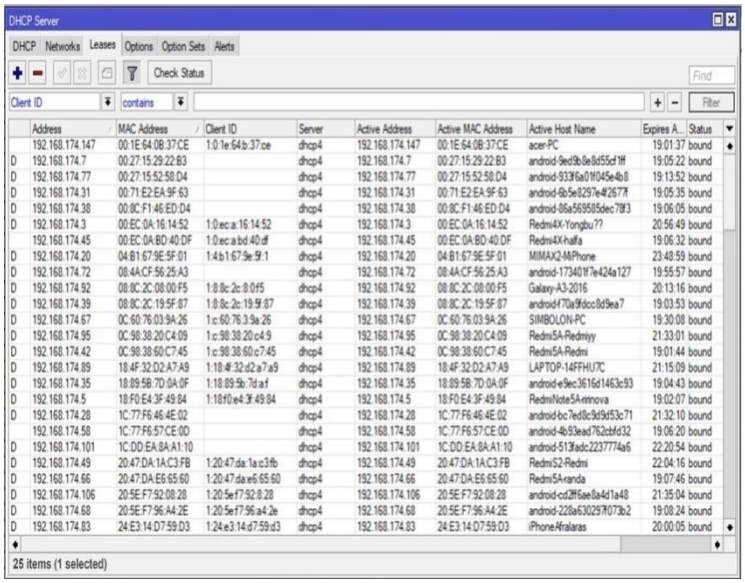

Figure 3. Display user list 25 internet access user

The selection of ASUS RT N12HP Access Point device in this research is able to support all Wi-Fi utilities on all laptop and smartphone devices with IEEE 802.11b network, IEEE 802.11g, IEEE 802.11n, IEEE 802.3, IEEE 802.3u, IPv4, IPv6 , and able to read data at 802.11b rate: 1, 2, 5.5, 11 Mbps, 802.11g: 6,9,12,18,24,36,48,54 Mbps, 802.11n: up to 300 Mbps. Access Point ASUS RT N12HP device is very precise to the needs of more efficient distribution of Wi-Fi access. In some tests made access point ASUS RT N12HP has been able to reach the coverage area as far as a radius of 150 meters so that the distribution of access to the internet can be better and efficient.

c. Testing Duration of Internet Access Usage

In the distribution of internet access to the user it is necessary to manage the ideal capacity in one area and the effective usage period. In this test is to determine the maximum limit of the user. So here the author divides into 2 access user status entry, active and passive user.

Active users are asserted that the internet usage is real-time and continuous online to the internet. While passive users that internet users are inconsistent in the use of the Internet which means used internet access online that do occur during the gap. Efficiency in passive internet users that will be managed with online duration with average bandwidth at 0.00 K / s up to 1.00 K / s over a span of 10 minutes.

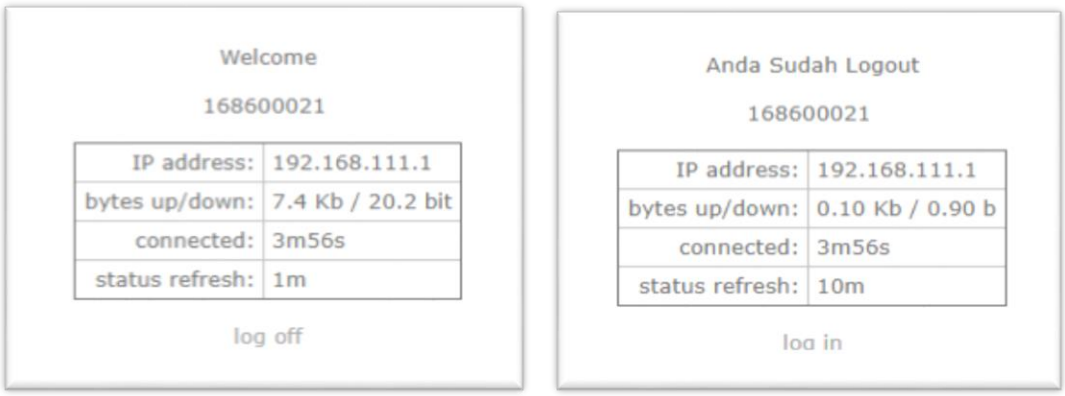

Figure 4. Access test results with user restrictions

From the results of tests conducted that the use of internet access by applying the greedy algorithm running according to the expected optimization. With the time range and duration that has been set so that it can be classified appropriately and systematically active users and passive users.

The parameters required are the users of Internet services in the area that has been done testing is monitored from continuous user activity so that access to the device provided to be more optimal and appropriate.

d. Test Results for 30 Login Access Users

In the previous explanation in load balancing factor testing using the greedy algorithm in Wi-Fi access based on classful protocol routing is adjusted with limitation capacity on Access Point ASUS RT N12HP which only can for 25 user access only. Testing is done exceeds the access capacity of access Point Access devices that is with the difference of 5 (five) more users so that the total will enter 30 (thirty) users with the assumption that there are two user status is active users and passive users.

The results in the table list show that the limited capacity of Access Point ASUS RT N12HP device which is only for 25 users only but successfully increased to 30 users with the assumption that 5 more users are passive users.

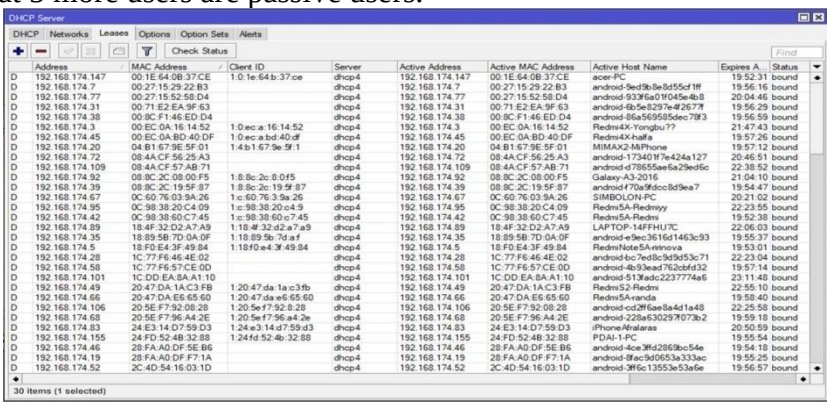

Figure 5. Display user list 30 internet access user

In the table shows that the user access entry has exceeded the capacity limit provided by access point ASUS RT N12HP device that is 30 users, so that access to internet users become more leverage.

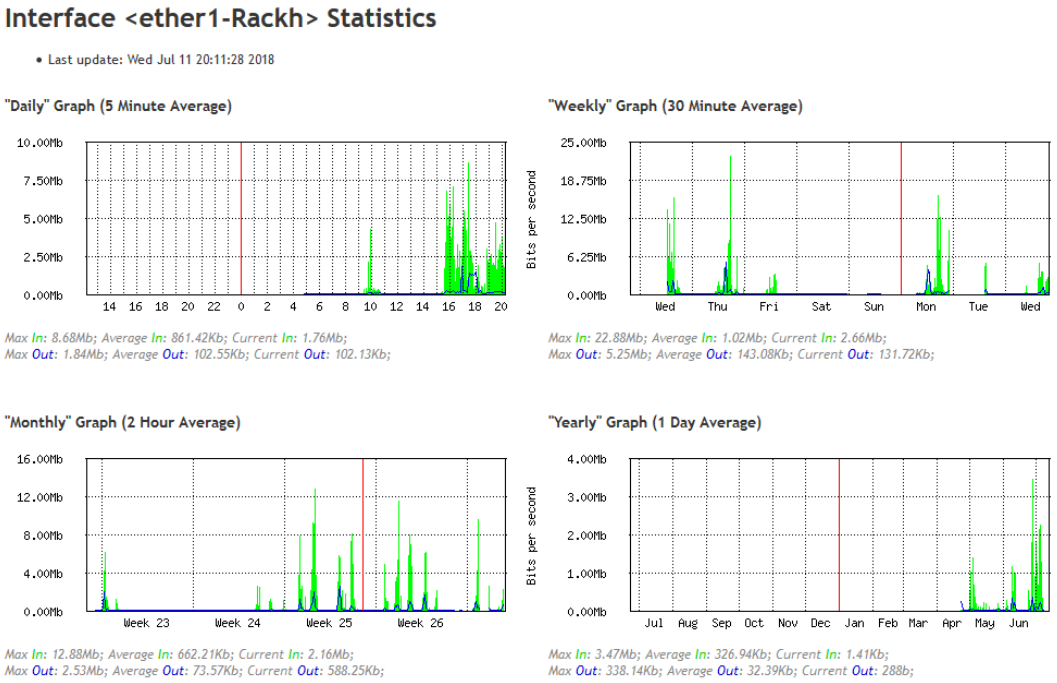

Figure 6. Graph of internet usage

The internet service user login graph using Wi-Fi obtained at the time of the test provides excellent and measurable results. In monitoring testing using a website-based application provided by the Mikrotic router can be classified into several user segments daily, weekly, monthly and yearly.

After testing the load balancing factor using the greedy algorithm in Wi-Fi access based on protocol routing classful with limited network size is fundamentally affecting the users of internet access that exceeds the capacity of the tools provided.

e. The Systematic Network

In general, to set and monitor the connection flow between the access point device that will continue to be utilized by users viewed from a crowded area of internet user access. This study was conducted at the point where the active crowd is located, namely in the Campus Library.

Without changing anything on the existing network topology and without changing the existing network structure. Here is an overview of a systematic network that has been running at the time of research.

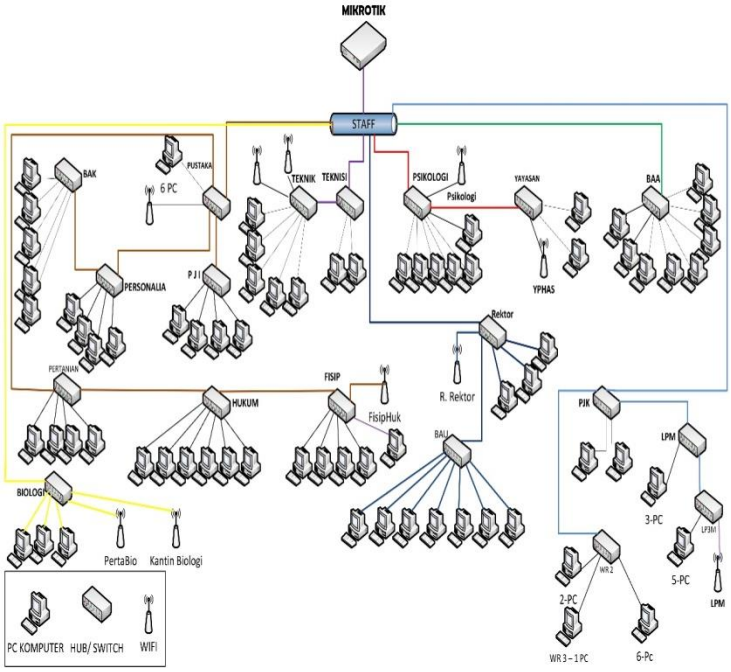

Figure 7. Map of campus network of University of Medan Area

5. Conclusions

Research is only focused on a single hotspot area that many users access the internet that is in the Center Library Bureau of Rectorate Building University of Medan Area. From the daily data that the author obtained that visitors who come using the internet facility service reaches more than 500 users every day during the active lecture.

6. References

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