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BANDWIDTH MANAGEMENT USING SIMPLE QUEUE METHOD IN INFORMATIC ENGINEERING LABORATORY OF MUSAMUS UNIVERSITY USING MICROTICS

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ABSTRACT

The use of bandwidth in the network sometimes has not been used optimally in its use. The more devices that access the internet, the greater the bandwidth needed. Upload and download speeds are influenced by the amount of bandwidth used by the network and how effective the bandwidth can be utilized. This internet access speed must be managed properly because it is related to the interests of internet access users so that there are no complaints or even connection failures on other users. One solution so that bandwidth can be utilized more optimally is by doing management on bandwidth so that bandwidth can be utilized optimally. With bandwidth management each client that accesses the internet already has their own bandwidth capacity. Simple Queue is one of the queuing techniques in the bandwidth management system on the proxy router. This queuing technique has ease in its configuration and has the simplest bandwidth distribution. Distribution of bandwidth is regulated statically so that no matter how many users are online, the bandwidth received is also constant, and even tends to decrease.

Keywords: Bandwith, Upload, Download, Simple Queue

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1. INTRODUCTION

The development of information technology especially computer networks is currently developing very rapidly along with the needs of the community for services that utilize computer networks [1]. This is marked by the development of technology in hardware and software which has had a considerable impact in the presentation of information [2]. Currently internet media is not only limited to text data but in the form of sound and video which is very burdensome to internet traffic during rush hour [3].

The use of bandwidth in the network sometimes has not been used optimally in its use. The more devices that access the internet, the greater the bandwidth needed. Upload and download speeds are influenced by the amount of bandwidth used by the network and how effective the bandwidth can be used [1]. This internet access speed must be managed properly because it is related to the interests of internet access users so that there are no complaints or even connection failures on other users [4]. Bandwidth is a measure of the amount of information that can flow from one place to another at a given time [5].

One solution so that bandwidth can be utilized more optimally is by doing management on bandwidth so that bandwidth can be utilized optimally. The purpose of bandwidth management in addition to maximizing existing bandwidth also aims to overcome congestion problems. Congestion is a condition where the data to be sent is greater than the available network (media) link capacity [1]. With bandwidth management, every client who accesses the internet already has their own bandwidth capacity so that when there are clients that require large bandwidth capacity both for uploading and downloading, other clients connected to the same network will not be disturbed. In doing bandwidth management, Simple Queue is used.

2. METHODOLOGY

2.1. Computer network

Computer network is a collection of two or more computers that are interconnected with each other to communicate data using communication protocols through communication media (wired or wireless), so that these computers can share information, data, programs, and use of devices hard together [5].

2.2. Microtics

Microtics is an independent operating system based on Linux specifically for computers that function as routers. Microtics is designed to be easy to use and very well used for computer network administration purposes such as designing and building a small to complex computer network system [6].

2.3. Bandwidth Management

Bandwidth is a measure of the maximum frequency range that data can flow from one place to another in a given time. Bandwidth is a quantity that shows how much data can be passed in a connection through a network [6].

Bandwidth Management is the process of measuring and controlling communication (traffic, packages) on a network link, to avoid filling in links for capacity or overfilling of links, which will result in network congestion and poor performance [4]. With good bandwidth management in the network, each user or user does not spend bandwidth in the network so that the service level is in accordance with the needs and priorities according to the user's request.

2.4. Simple Queue

Is a bandwidth management method in Microtics [7]. Simple Queue is one of the queuing techniques in the bandwidth management system on Microtics routers. This queuing technique has ease in its configuration and has the simplest bandwidth distribution. Distribution of bandwidth is regulated statically so that regardless of the number of users online, the bandwidth received is also fixed, even tends to decrease [6].

The basic parameters of simple queue are Target and Max-limit. The target can be in the form of an IP address, network address, and can also be an interface that will be governed by bandwidth. Max-limit Upload / Download is used to provide maximum bandwidth download.

3. RESULTS AND DISCUSSION

Retrieval of data in this study was conducted at the Informatics Engineering Laboratory, during working hours so that the number of users was quite large.

3.1. Bandwidth sharing design

Before sharing bandwidth on Microtics, it is necessary to divide the bandwidth for each user. The bandwidth used is 10 Mb. Distribution of bandwidth is determined based on the type of user that will be connected later on Microtics.

Table 1. Distribution of bandwidth upload and download based on user

User	Upload	Download
Head Dept	1 mb	1 mb
Secretary Dept	1 mb	1 mb
Head Lab	1 mb	1 mb
Lecturer	512 kb	512 kb
Staff	256 kb	256 kb

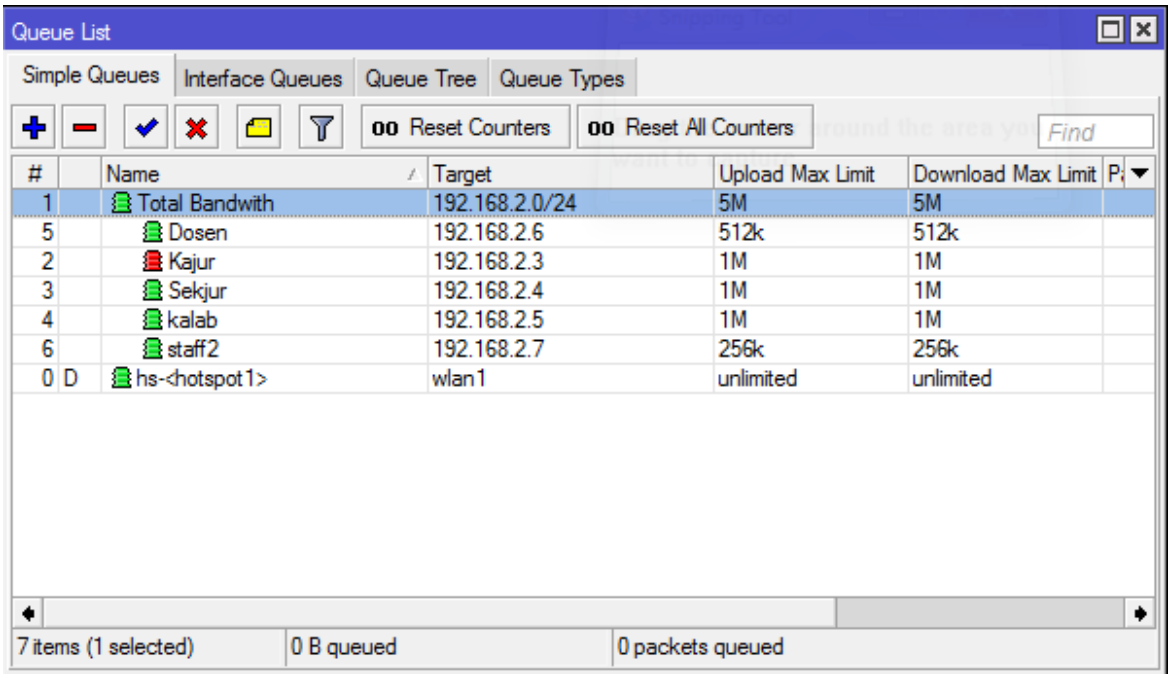

Figure 1. Queue List based on user

3.2. Microtics configuration

In configuring IT Lab bandwidth management, Microtics used, namely Microtics series RB 433 configuration, are carried out as follows:

- To be able to enter Microtics you can use Winbox installed on your PC / Notebook. After Winbox starts, then fill in the router IP 192.168.2.1 with the login "admin" and password, then click the Connect button.
- After Connect, select click the Queue menu in Winbox, then click the (+) sign on the Simple Queue tab.
- Give bandwidth to the user specified for upload and download.
- Next is to create a child queue, the configuration of the child queue is not much different from the Parent Queue configuration. In the configuration of the child queue Target Address, the IP client will be limited to bandwidth. For the max upload target limit and the max download limit limit is filled in according to the amount of bandwidth that will be allocated to each user.

3.3. Network testing

3.3.1. First download testing

Downoad testing on the first test is carried out only on 1 user who actively accesses the website.

Table 2. Download speed based on user

User	Bandwith	IP Address	Download Speed
Head Dept	1 mb	192.168.2.3	992.7 Kbps
Secretary Dept	1 mb	192.168.2.4	997.3 Kbps
Head Lab	1 mb	192.168.2.5	845.2 Kbps
Lecturer	512 kb	192.168.2.6	462.2 Kbps
Staff	256 kb	192.168.2.7	136.1 Kbps

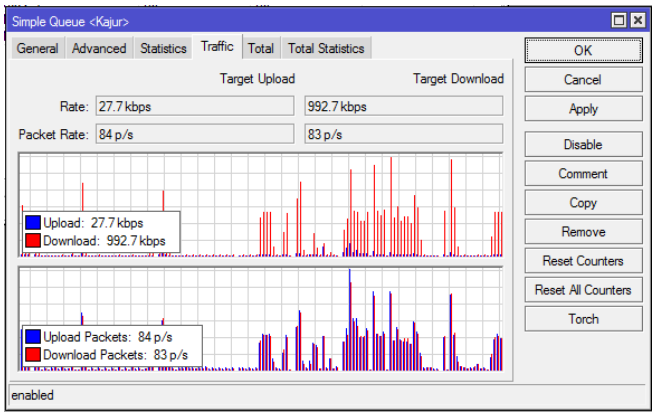

Figure 2. Test Download User Head Dept

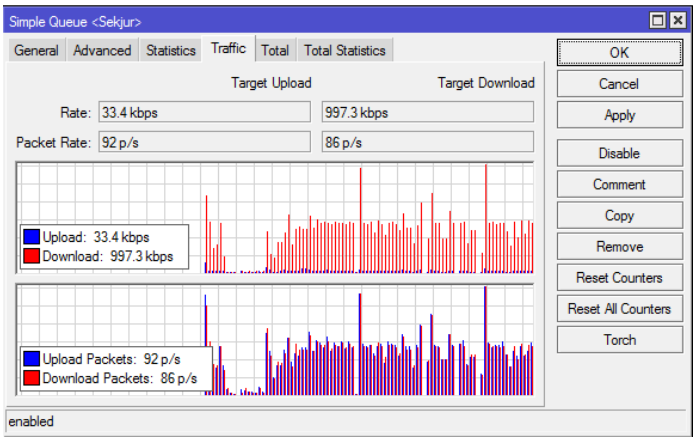

Figure 3. Test Download User Secretary Dept

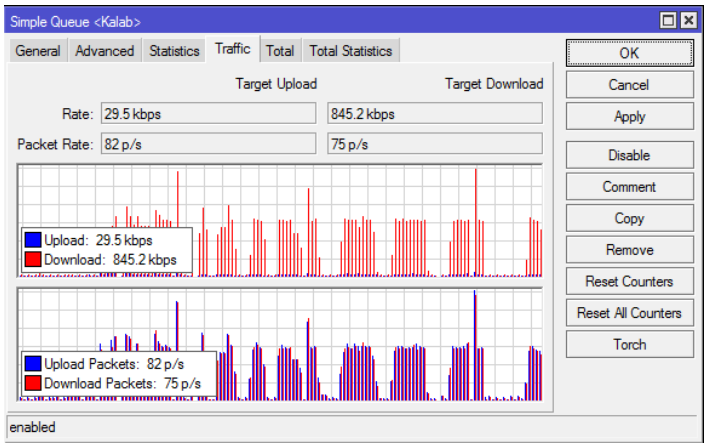

Figure 4. Test Download User Head Lab

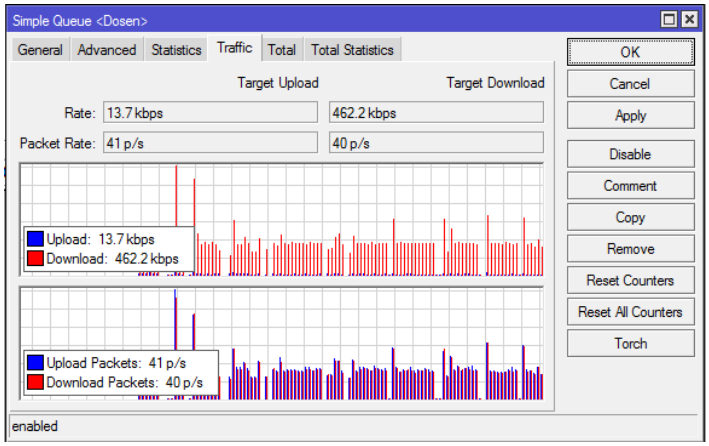

Figure 5. Test Download User Lecturer

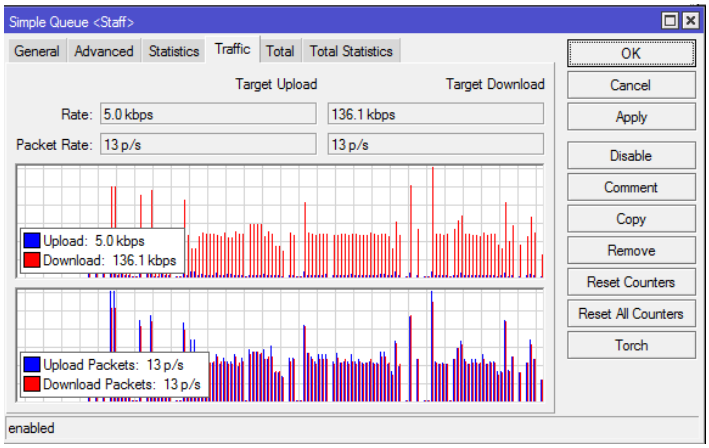

Figure 6. Test Download User Staff

3.3.2. Testing the second download

Download Testing In the second test, all active users access the website, together.

Table 3. Download speeds using 5 users

User	Bandwith	IP Address	Download Speed
Head Dept	1 mb	192.168.2.3	735.6 Kbps
Secretary Dept	1 mb	192.168.2.4	825.6 Kbps
Head Lab	1 mb	192.168.2.5	631.7 Kbps
Lecturer	512 kb	192.168.2.6	336.3 Kbps
Staff	256 kb	192.168.2.7	256.0 Kbps

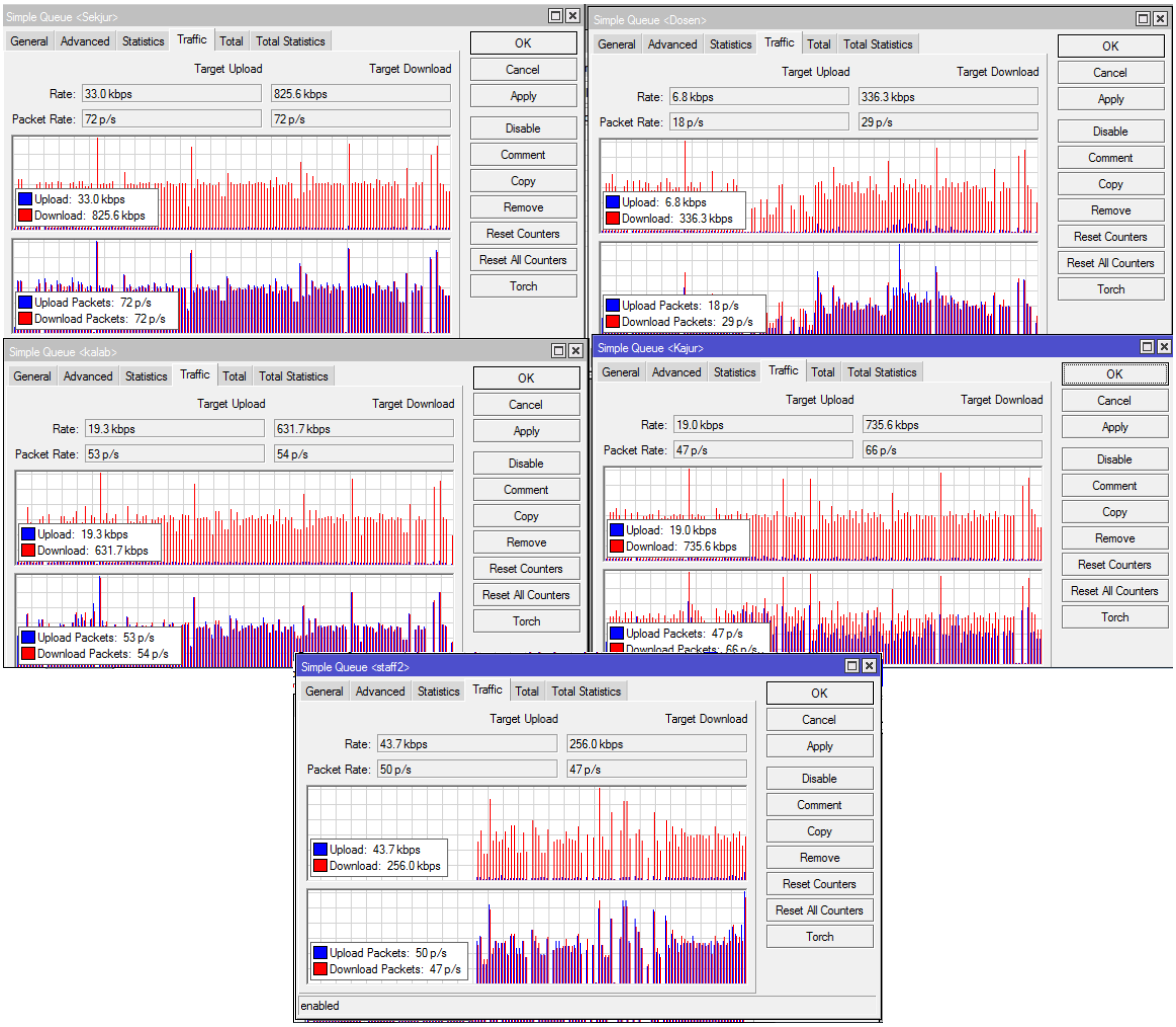

Figure 7. Test Download using 5 active users

3.3.3. First upload test

Download testing in the first test, only one active user and 145 MB of uploaded files to Google Drive were performed.

Table 4. Upload speed based on user

User	Bandwith	IP Address	Upload Speed
Head Dept	1 mb	192.168.2.3	970.8 Kbps
Secretary Dept	1 mb	192.168.2.4	761.4 Kbps
Head Lab	1 mb	192.168.2.5	932.9 Kbps
Lecturer	512 kb	192.168.2.6	468.7 Kbps
Staff	256 kb	192.168.2.7	177.2 Kbps

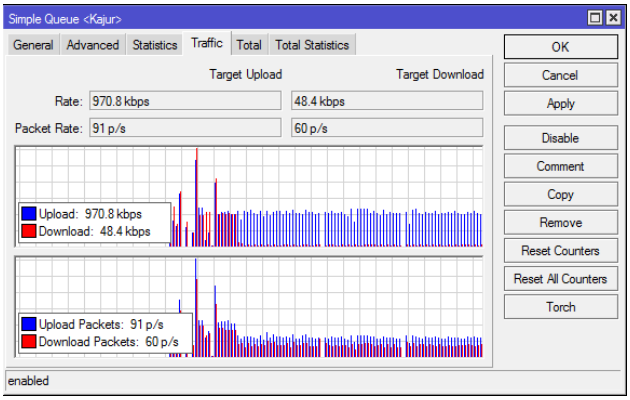

Figure 8. Test Upload User Head Dept

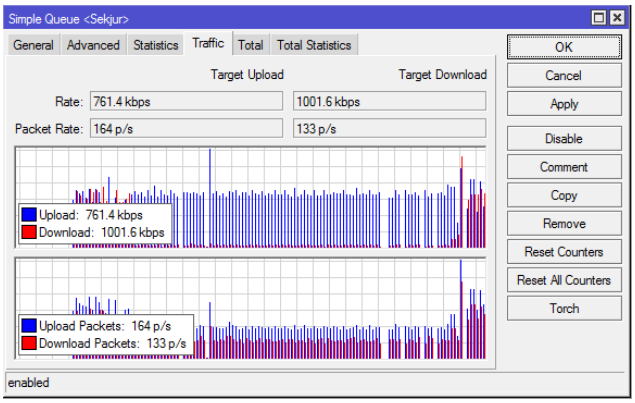

Figure 9. Test Upload User Secretary Dept

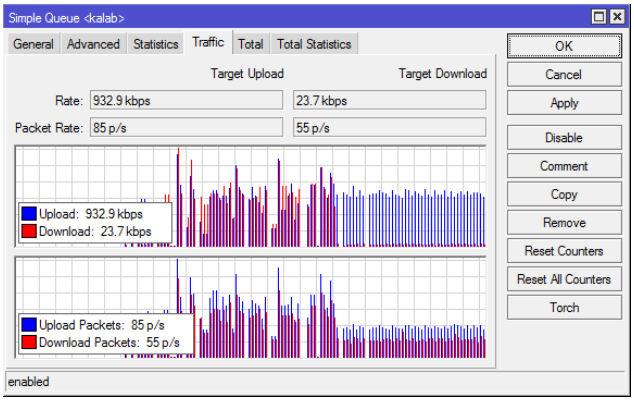

Figure 10. Test Upload User Head Lab

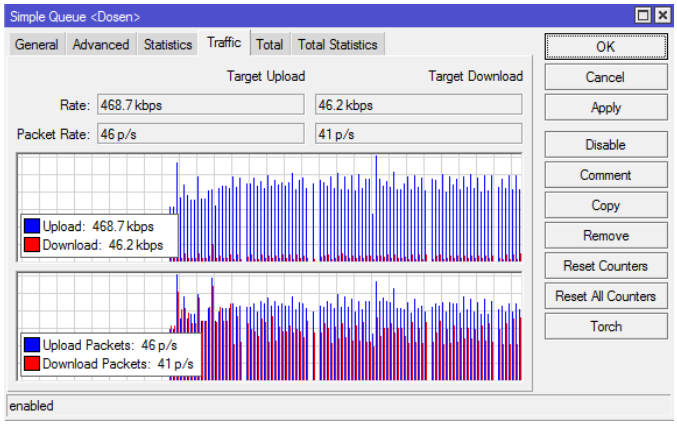

Figure 11. Test Upload User Lecturer

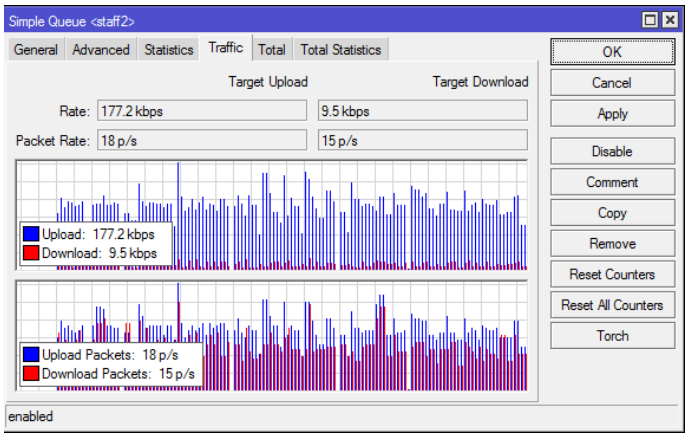

Figure 12. Test Upload User Staff

3.3.4. Test the second upload

Testing of uploads on the second test is done when all active users are shared and files uploaded are 58.9MB to Google Drive.

Table 5. Upload speed using 5 users

User	Bandwith	IP Address	Upload Speed
Head Dept	1 mb	192.168.2.3	470.9 Kbps
Secretary Dept	1 mb	192.168.2.4	688.4 Kbps
Head Lab	1 mb	192.168.2.5	182.4 Kbps
Lecturer	512 kb	192.168.2.6	425.9 Kbps
Staff	256 kb	192.168.2.7	56.0 Kbps

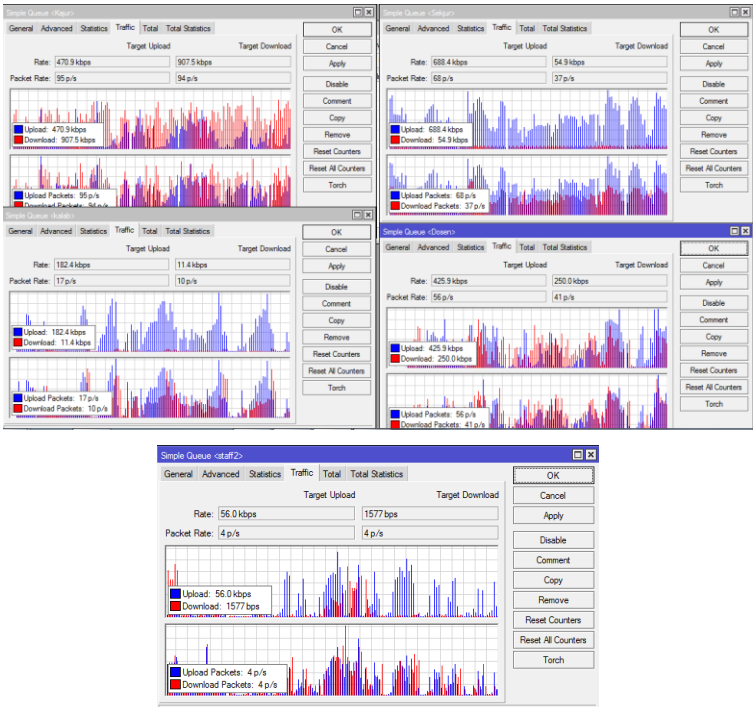

Figure 13. Test using 5 active users

3.3.5. Test data downloaded and uploaded

In the download and upload test for each user the data is obtained as follows:

Table 6. Download and upload speeds using 1 active user

User	Bandwith	Download Speed	Upload Speed
Head Dept	1 mb	992.7 Kbps	970.8 Kbps
Secretary Dept	1 mb	997.3 Kbps	761.4 Kbps
Head Lab	1 mb	845.2 Kbps	932.9 Kbps
Lecturer	512 kb	462.2 Kbps	468.7 Kbps
Staff	256 kb	136.1 Kbps	177.2 Kbps

Table 7. Download and upload speeds using 5 active users

User	Bandwith	Download Speed	Upload Speed
Head Dept	1 mb	735.6 Kbps	470.9 Kbps
Secretary Dept	1 mb	825.6 Kbps	688.4 Kbps
Head Lab	1 mb	631.7 Kbps	182.4 Kbps
Lecturer	512 kb	336.3 Kbps	425.9 Kbps
Staff	256 kb	256.0 Kbps	56.0 Kbps

4. CONCLUSION

Based on the research and the results of the tests performed, the following conclusions are obtained:

1. In Simple Queue networks that are built based on user profiles, the speed that is not always stable is obtained for each user even though it has been monitored according to the profile.

2. The download and upload speeds for each user are also affected by the stability of the internet connection when downloading and uploading.

3. When there is only one active user, the download and upload speeds are in accordance with the bandwidth given to the profile of each user, while when all active users do not affect other user bandwidth.

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