



## Computer Network Analysis Using The Queue System In Mikrotik

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### ABSTRACT

Nowadays the development of the internet has been very rapid along with its development, internet traffic has become very dense. Therefore an administrator must be very clever to do bandwidth management. Bandwidth management is very important in managing bandwidth allocation that will be given to users to avoid struggling for bandwidth allocation on the network. By using a proxy router, an administrator can easily do that, however within the proxy router there are several queuing methods that can be used to manage bandwidth. the purpose of this study is (i) Can implement bandwidth management using the queue system on the router, (ii) Can know the queuing system testing to handle network traffic using a router. The research methods used are identification, design, implementation and testing. The results obtained are the best transfer rate with a total value of 112.7216 KB / second using the BFIFO queuing system. The smallest bytes queue is PCQ with a total value of 276.8 MiB and the most is SFQ with a total value of 283.4 MiB, the smallest queue of packets is RED with a total value of 220861 packets and the most is BFIFO with a total value of 225414 packets.

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## 1. Introduction

Queuing system in a network management consisting of HTB, PCQ, SFQ, RED, FIFO with different algorithms differs from all the queuing systems. this research will conduct an analysis between HTB (Hierarchical Token Bucket) queuing system, PCQ (PerConnectionQueue), SFQ (StochasticFairnessQueue), RED (RandomEarlyDrop), FIFO (FirstInFirstOut)[2,3&9]. Hierarchical Token Bucket that aims to implement link sharing precisely and fairly, in link sharing counseling, if a class requests less than the amount of service that has been assigned to it, the remaining bandwidth will be distributed to other classes that ask for service, PCQ works with calculate the amount of bandwidth, then automatically connected users where the entire available bandwidth will be shared with active users so that the bandwidth is shared equally, Stockhastic Fairness Queue (SFQ) ensures packets that can enter by dividing it using roundrobin algorithm, Random Eearly Drop (RED) is a queue mechanism that tries to avoid network congestion by controlling the queue average value, FIFO is the default method that is active on the network device interface[4,5&8]. First-in First-Out or FIFO is run by creating a simple buffer to hold incoming packets for a while. the queue system already exists in the router device. The queuing system aims to anticipate the occurrence of internet traffic on and one of the solutions of a management on the network[6,7&10]. The formulation of the problem in this research is (i) How to implement bandwidth management using a queue system on the router? And (ii) How do you know about queuing system testing to handle network traffic using a router? The purpose of this study is (i) Can implement bandwidth management using the queue system on the router, (ii) Can know the queuing system testing to handle network traffic using a router.

## 2. Research Methods

The research method or framework in this research is to carry out a gradual and directed research as shown below



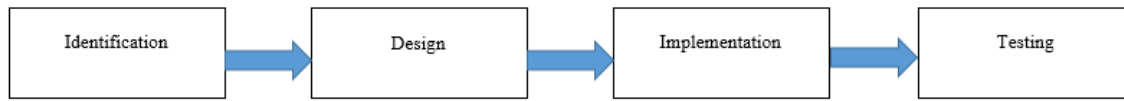


Fig 1. Research Method

### 3. Result

#### 3.1 Identification

Based on the stages of the analysis conducted, get some useful information for conducting this research. The information includes hardware requirements (hardware) and software requirements (software), in order to get results from the HTB (Hierarchical Token Bucket) queuing system, PCQ (PerConnectionQueue), SFQ (StochatisFairnessQueue), RED (RandomEarlyDrop), FIFO (FirstInfirstOutstutut Bucket) ) better.

#### 3.2 Identify hardware requirements

On the device hardware requirements analysis (hardware) There are several hardware devices to support computer network analysis using a queue system as in table 1.

Table 1.  
Hardware Requirements

No	Device	Amount	Spesification
1	PC	5 Unit	Minimal Pentium® Dual-Core E5400 @2,70Ghz (2 CPIs), ~2,7GHz, RAM : 2 GB, HDD : 120 GB(sistem)
2	Switch	2 Unit	Cisco SF90-24 24-Port 10/100 Cisco SF100-24 24-port 10/100
3	Router	1 Unit	RB951-2nm, RAM : 32MB Ports : 5 ethernet AP 2,4 GHz, antenna embeded 1,5 dbi

#### 3.3 Identify software requirements

At the stage of identifying software requirements (software) there are several software tools to support computer network analysis using a queuing system as in table 2.

Table 2.  
Software Requirements

No	Software	description
1	Windows 7	The operating system used to build, test and run programs in research.
2	Google Chrome	This application is used in this study to function to run or test the system that has been made by researchers
3	Winbox	Software used to remote a proxy server into GUI mode through the Windows operating system
4	Network Meter	Software used to test network performance
5	Stopwatch	Software used to determine test time.

#### 3.4 Design

Network topology in this study uses a network topology that is currently running. The following network topology existing



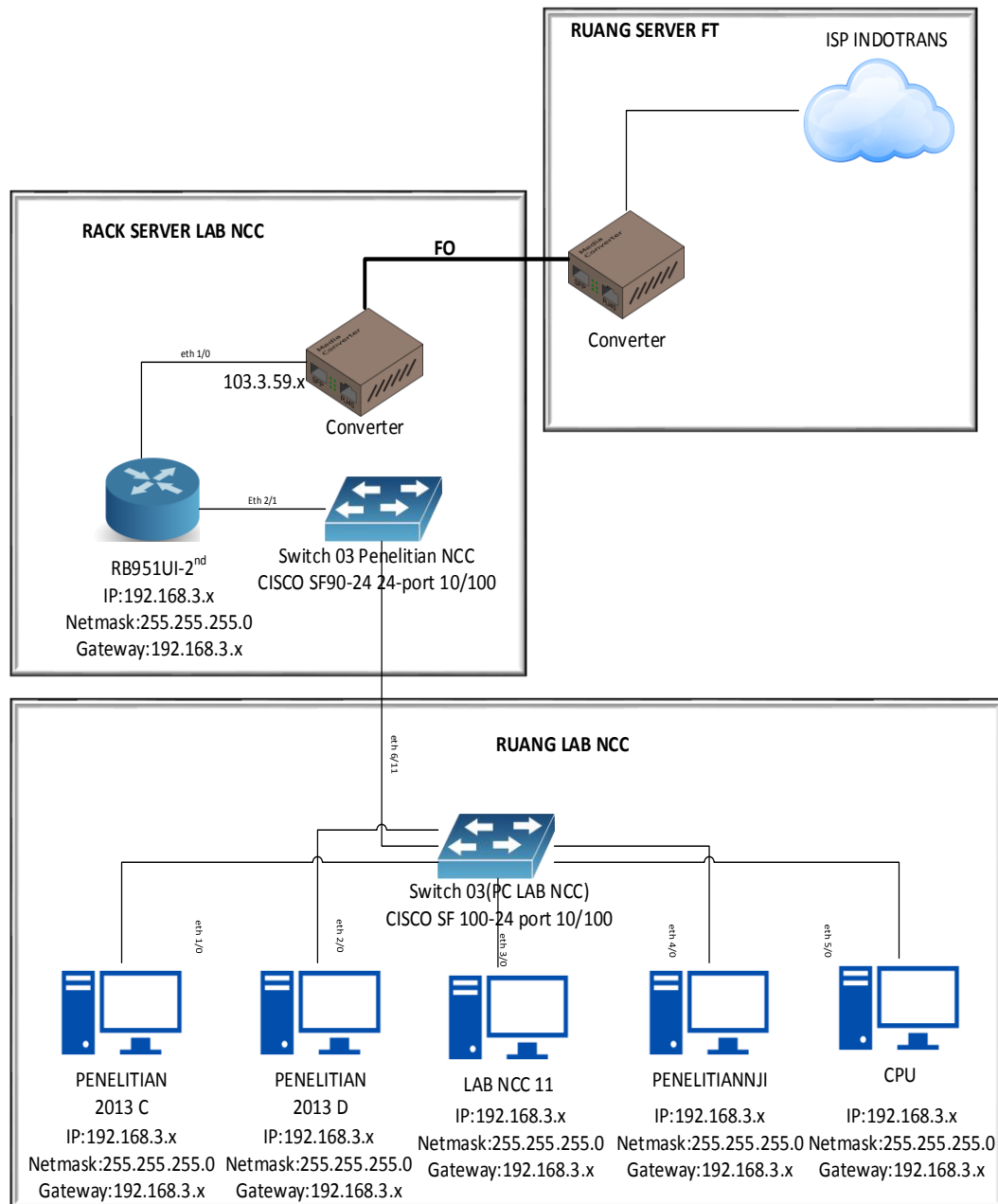


Fig 2. Topologi Existing.

Based on Figure 2 that the network topology is running, where internet sources obtained from ISP Indotrans are connected to the RB 951UI-2nd router from the FT server room to the rack server lab using FO cable via IP 192 media converter.168.3.x, then the router is connected to switch 01 (NCC Research) Cisco SF90-24 -24-port 10/100 using Cat 6 UTP cable, NCC lab room using switch 03 (NCC Lab PC) Cisco SF 100-24 ports 10/100 are connected from the rack research switch NCC server uses Cat 6 UTP cable, then the client PC is connected to the NCC Lab PC Switch using Cat 6 UTP cable with IP 192.168.3.x - 192.168.3.x..

### 3.5 Implementation

At the implementation stage all the design results that have been carried out are implemented on a real system. The following are the stages of implementation that will be carried out.

- Mikrotik Router Access Stage.  
Mikrotik can be accessed using the Winbox tool. Winbox is a popular tool for remote proxying because it already displays menus on the GUI proxy.
- Creating a mangle firewall

Mangle works by marking connections with mark-connections, mark connections using connection tracking and New connection information will be added to the connection tracking table.

c) Queue Making Stage

This stage is used to process the queue of an incoming packet.

3.6. Testing

a) Transfer rate of each queue system

This test is carried out by testing the transfer rate, using a network meter application with a max limit number in each queuing system that is 256k, 512k, 1024k, 2048k. the results of research conducted in the form of measurements of the output bandwidth of each queue system. Transfer rate testing when the queuing system is running on the Windows operating system using winbox and network meter tools, the transfer rate results are obtained as shown in Figure 3.

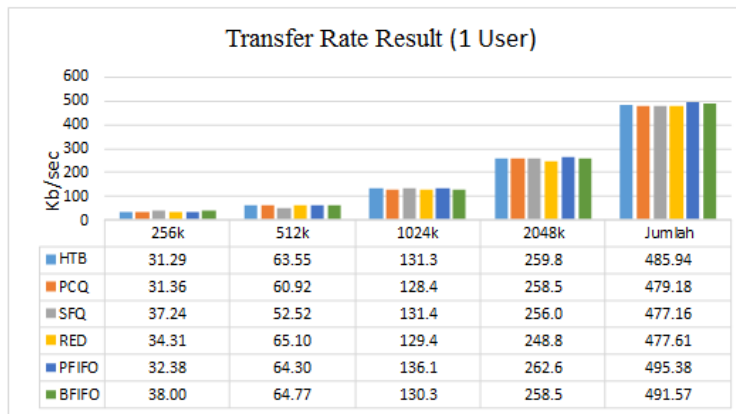


Fig 3. Transfer Rate Result (1 User).

In Figure 4 shows the results of the transfer rate of each queuing system used by the client to download obtained from the network meter application produces the best value on the PFIFO queuing system which is a number of 480,799 Kb / second.

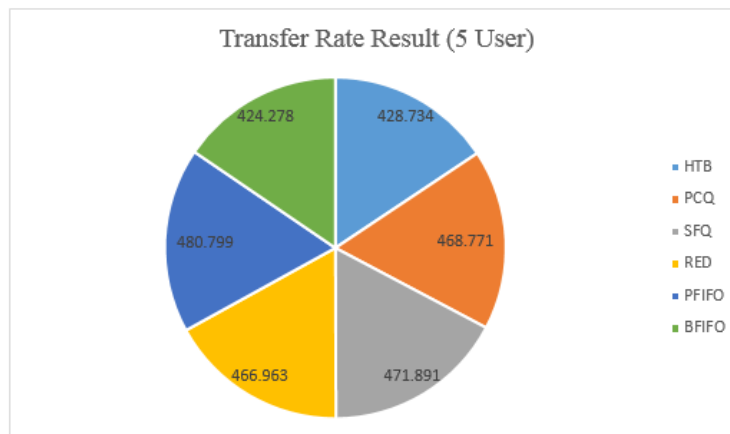


Fig 4. Transfer Rate Result (5 User)

b) Queue rate of each queue system

This test is carried out with 4 times testing with max limit 256k, 512k, 1024k, 2048k with 6 queuing systems using the winbox application with the same configuration. The test is carried out for 10 minutes on each queuing system using a stopwatch. the results of research conducted in the form of measurements of the output bandwidth of each queue system. This test uses several parameters. The parameters used in this study refer to which queuing system is most appropriate for the configuration performed and which method has the least queuing bytes.



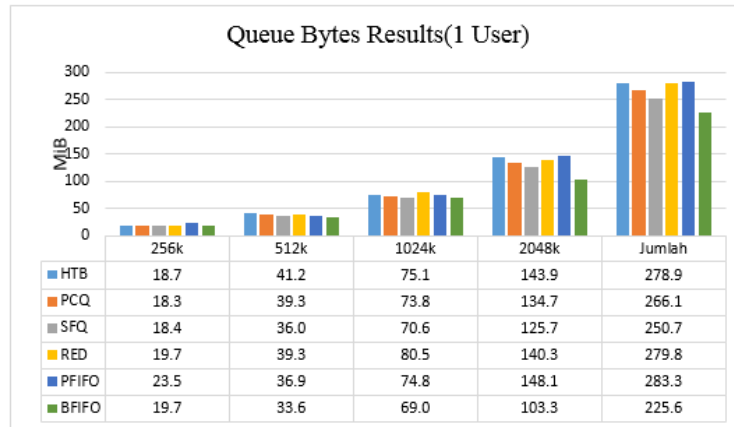


Fig 5. Queue rate of each queue system

In Figure 6 shows the results of Queue Bytes from each queue system used by the client to download obtained from the Winbox application resulting in the least queue is PFIFO, which is 293.2 MiB.

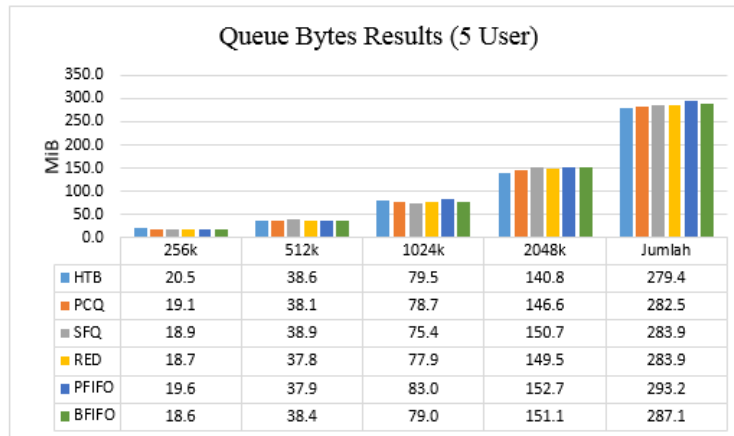


Fig 6. Queue Bytes Result (5 User)

#### 4. Conclusion

Based on the research that has been done, the following conclusions can be drawn: (i) To implement bandwidth management using a queue system, the first is to do the router configuration by creating a firewall mangle mark connection and mark packet. After the mark connection and mark packet are made, the next time the queue system is created. queuing system is made with a queue type, the queue system used is HTB, PCQ, SFQ, RED, PFIFO, BFIFO. Then the queuing system is entered into the queue tree, by entering the connection mark and mark packet that has been made to be implemented on the router. (ii) System testing is carried out using a network meter and winbox application, with the help of the google chrome browser for download / streaming. The results obtained from the transfer rate are sorted from best to lowest, namely the BFIFO method with a value of 480,799 KB / Second, the SFQ Method with a value of 471,891 KB / Second, the PCQ Method with a value of 468,771 KB / Second, the RED Method with a value of 466,963 KB / Second , HTB Method with a value of 428,734 KB / Second, PFIFO Method with a value of 424,278. The results obtained from the Bytes Queue values are sorted from the best to the lowest at 283.3 MiB with the PFIFO method, 279.8 MiB with the RED method, 278.9 Mib with the HTB method, 266.1 MiB with the PCQ method, 250.7 MiB with the SFQ method, 225.6 MiB with the BFIFO method . The results obtained from the value of the Queue Packets are sorted from the best to the lowest, namely 283004 with the HTB method, 261434 with the PFIFO method, 259072 with the BFIFO method, 258901 with the SFQ method, 255511 with the RED method, 254035 with the PCQ method.

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