

MikroTik Bandwidth Management to Gain the Users Prosperity Prevalent

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Abstract – MikroTik operating system is designed as a network router. It is the operating system and software that can be used to make a computer into a reliable network router. The computer includes a variety of features for IP networks and wireless networks. These functions include Firewall & Nat, Bandwidth Limiter, Routing, Hotspot, Point to Point Tunneling Protocol, DNS server, DHCP server, Hotspot, and many other features. On a network that has many clients, it requires a bandwidth adjustment mechanism to prevent the bandwidth over the limit. All clients get their bandwidth fairly. Bandwidth Management is the method used to meet those needs. Limiting bandwidth on MikroTik Hotspot is necessary to perform. Wireless hotspot can be accessed anywhere to whom it may have the access policy. Bandwidth Limitation is required to promote justice and prosperity prevalent in all the hotspot user.

Keywords – Bandwidth, Network, MikroTik

I. INTRODUCTION

The internet access today is the imperative aspect. It is necessary to either search information or play online games. Distribution of bandwidth is a very important thing to do by an internet service provider [1][2]. This can be done using a computer or device that can limit the speed of the internet. MikroTik Router is one of both hardware and software vendors that provide facilities to perform bandwidth management. It also provides the operating system that is specifically used to create a router [6][7]. It is done by installing it into the computer. The tools provided in MikroTik Router is well-equipped to build a stable and reliable router.

Internet Service Providers realize that a bandwidth is the most important part of a network. Bandwidth limiter is indispensable for the creation of a fast and flexible access that the Internet connection is stable according to the needs in each part of the need for bandwidth management to divide the amount of bandwidth is needed. Bandwidth management is very easy, and efficiently used by any internet service provider for using the bandwidth of each user will gain speed with the same grade or size without disturbing the speed to another user [4][5]. To

overcome the above problems, it needs to build a system to manage traffic on the Internet network.

II. THEORIES

A. A Brief History

MikroTik made by MikroTikls, a company in the city of Riga, Latvia. Latvia is a country that is a "fraction" of the former Soviet Union or Russia today. Its establishment was initiated by John Trully dan Arnis Riekstins. John Trully is an American citizen who immigrated to Latvia. In Latvia, he met with Arnis, a scholar of Physics and Mechanics around 1995. John and Arnis began routing the world in 1996. The mission of MikroTik is routing all over the world. MikroTik originally intended for Internet Service Provider (ISP) serving customers using wireless technology. Currently, MikroTikls provides services to many wireless ISPs for Internet access services in many countries in the world and is also very popular. MikroTik provides hardware and software devices for Internet connectivity in most countries around the world.

MikroTik started with Linux and MS-DOS technology combined with Wireless LAN AERONET speed of 2 Mbps in Moldova [3]. Then he serves five customers in Latvia. Their basic principle is not to make the Wireless ISP, but it makes the program a router that is reliable and can run around the world. Latvia is only an experiment where John and Arnis because now they have the help of other countries including Sri Lanka which serves approximately 400 users.

Linux was first used is Kernel 2.2 which was developed jointly with the assistance of the staff of 5-15 people Research and Development (R & D) that now dominate the world MikroTik routing in developing countries. According to Arnis, besides the staff MikroTik environment, they also recruit freelance and third parties to develop an intensive marathon MikroTik.

B. MikroTik

MikroTik uses Linux as its operating system. It is used as a network router. It is created to provide

convenience and freedom to its users. The administration settings can be done using the Windows Application; it is called "WinBox". The computers that will be used as a MikroTik router also does not require a high specification [3][5]. For example, it is only as a gateway. Unless it is used for complex networks, it should use adequate specifications. MikroTik features include Firewall & Nat, Hotspot, Routing, Bandwidth Limiter, DNS server, Point to Point Tunneling Protocol, Hotspot, DHCP server, and many more.

MikroTik is a computer operating system and computer software that is used to make the ordinary computer into a router. MikroTik divided into two, MikroTik RouterOS and RouterBoard. MikroTik RouterBoard does not require a computer to run it; it is sufficient to use a board that already include the MikroTik RouterOS. It includes features which particularly made for IP networks and wireless networks.

MikroTik featured hardware products are Routers, Switches, Antennas, and other supporting devices while the flagship software product is MikroTik RouterOS as shown in Figure 1. MikroTik RouterOS is the operating system that can be used to modify the computer system into a reliable network router, includes various features which made for IP networks and wireless networks, suitable for use by ISPs and hotspot providers. The installation is not required additional software or other additional tools. It is created for administrative management such as computer network design and build a small-scale computer network systems to complex ones.



Fig. 1 MikroTik RouterOS

Figure 2 shows the MikroTik RouterBoard. It is the embedded router products from MikroTik. Routerboard as an integrated mini PC because it has processors, RAM, ROM, and flash memory. It uses RouterOS that serves as a network router, bandwidth management, proxy server, DHCP, DNS server and hotspot server. There is several series router board which can also function as Wi-Fi as a Wi-Fi access point, bridge, or as Wi-Fi WDS client (RB411, RB433, RB600). Most ISPs use the Wireless LAN function to run either as an Access Point or Client. It can be executed without depending on the PC

anymore since all the functions on the router already inside. When compared with a PC that is installed RouterOS, router board size is smaller, more compact and power-efficient as simply using an adapter. For use in the Wi-Fi, network can be installed on the tower and use PoE as a current source.



Fig. 2 MikroTik RouterBoard

III. RESULT AND DISCUSSION

A. Topology

MikroTik must be placed once after the ADSL or Internet Modem. Every device which is put before the router board will be skipped and cannot be managed by the router board. The router board controls everything below it. Figure 3 shows the router board position. The router board now controls the PC Clients through the Switch or the connection from the Access Point speed.

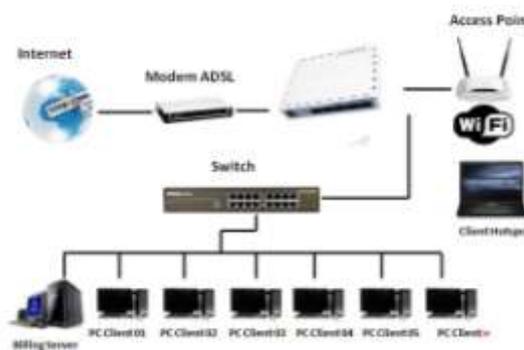


Fig. 3 MikroTik Topology

B. Configuration

Before doing the configuration, there are several things must be prepared. There are:

- ❖ WinBox
- ❖ Public IP : 192.168.26.7
- ❖ Gateway : 192.168.26.254
- ❖ DNS server : 10.11.12.1
- ❖ MikroTik RouterBoard standard IP is: 192.168.88.1
- ❖ Login Name : admin

❖ Login Password : (leave blank)

The first thing to do is to set up the IP Address on the PC. IP Address used is 10.10.20.8. This IP follow each rule that has been set on the MikroTik router.



Fig. 4 IPv4 Address configuration

Figure 4 describes the IP configuration. The IP address can be set in class A, B, or C. The first thing to do is to ping the MikroTik router by typing the command in terminal prompt. Once the PC and the router have been connected, open the WinBox application, select the name of the IP router address that wants to be set and select connect.

After connect, on the start screen of the program is on the toolbar "interfaces" there will be some of the ethernet port. This study uses five ports of ethernet. Two of these ports will be renamed, "Internet" and "LAN." To rename a port, click twice on the ethernet that wants to be changed and replace the name with the desired name (Internet and LAN). This following figure shows the how to change the port name.

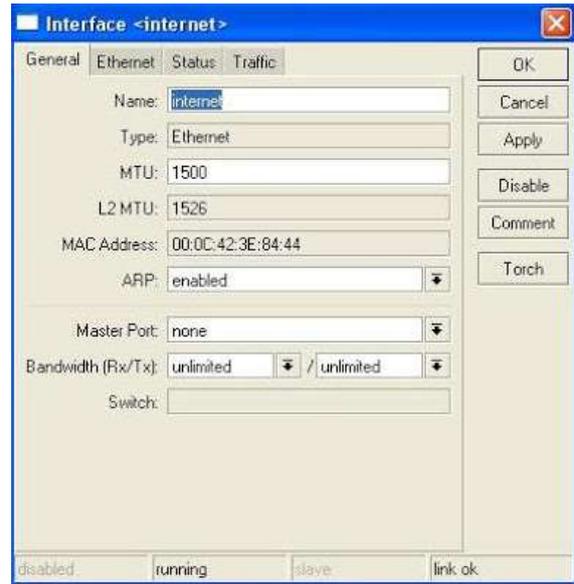


Fig. 5 MikroTik Interface (Internet)

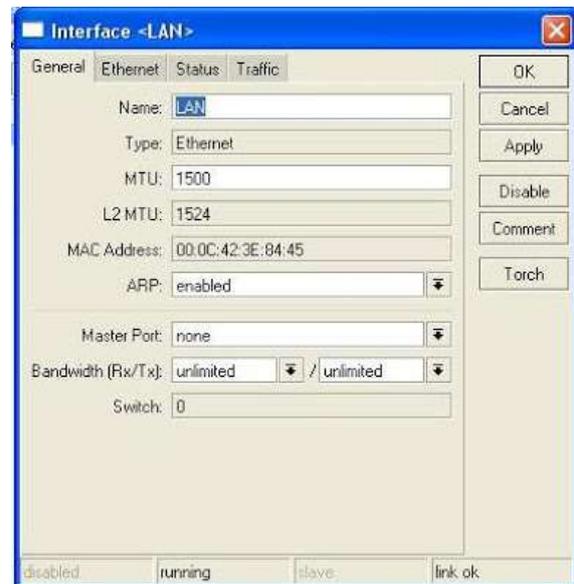


Fig. 6 MikroTik Interface (LAN)

Figure 5 and 6 show how to set the new name for the interface. Each ethernet has a unique MAC Address. The receive and transmit bandwidth are also can be determined for limited values.

The next step is to configure NAT Rule. Network Address Translation, or more commonly referred to as NAT is a method to connect more than one computer to the Internet using a single IP address. The amount of use of this method due to the limited availability of IP addresses, the need for security, and ease and flexibility in network administration.

Currently, the IP protocol is widely used IP version 4 (IPv4). With a length of 4 bytes address means that

there are 2 to the power 32 = 4,294,967,296 IP addresses available. This amount is theoretically the number of computers that can directly connect to the internet. Because of this limitation, most of the Internet Service Providers will only allocate one address for a single user, and this address is dynamic. A given IP address will be different every time the user connects to the Internet. On the one hand, the user needs many computers connected to the Internet, but on the other side, only a single IP address can be connected to the internet. This can be overcome by using NAT. With NAT gateways that run on one computer, an IP address can be shared by several computers to another and they can connect to the Internet simultaneously.

For example, if the users want to hide the local network / LAN 192.168.0.0/24 behind one IP address 202.51.192.42 provided by the ISP, which we use is a feature of Mikrotik source network address translation (masquerading). Masquerading will change the data packets source IP address and port of the network 192.168.0.0/24 to 202.51.192.42 to subsequently forwarded to the global Internet network.

C. Bandwidth Limiter

After NAT Rule configuration is completed, the next step is to distribute bandwidth to each user. This can be done by going to the menu queues. On the toolbar click queues then add or add it by clicking the plus sign (+) on the toolbar. In Simple Queue the General section fill as below:

Name : PC1
 Target Address : 10.10.20.2
 10.10.20.3
 10.10.20.4
 10.10.20.5
 Target Upload : 384 kbps
 Target Download : 384 kbps

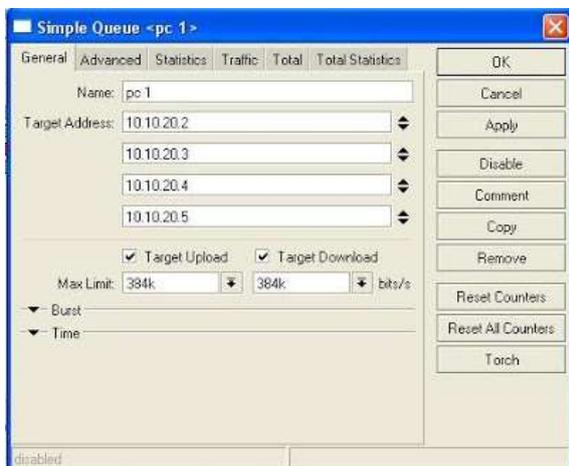


Fig. 7 MikroTik Simple Queue (PC1)

Name : PC2
 Target Address : 10.10.20.6
 10.10.20.7
 10.10.20.8
 10.10.20.9
 10.10.20.10
 Target Upload : 128 kbps
 Target Download : 128 kbps

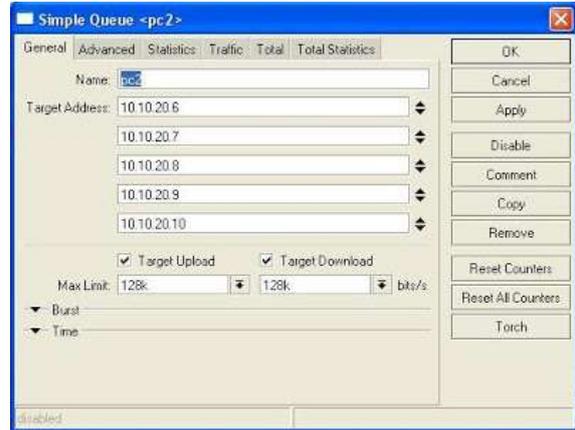


Fig. 8 MikroTik Simple Queue (PC2)

Figure 7 and 8 show the bandwidth configuration. The purpose of the trial is the bandwidth 10.10.20.2 IP Address - 10.10.20.5 will gain bandwidth of 384 kbps, whereas the PC2 with the IP Address 10.10.20.6 - 10.10.20.10 will gain bandwidth of 128 kbps of total bandwidth capacity. The following figure describes the distribution of bandwidth capacity.

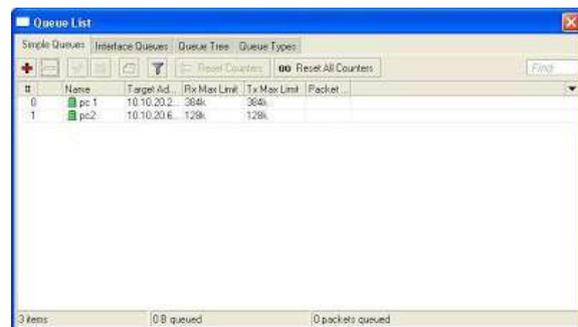


Fig. 9 Queue List

After configuring the bandwidth, browse to some websites is one way to test whether the bandwidth limitation is successful or not. To see the activities of each user can be done by using the Torch tool menu as shown in Figure 10; it serves for monitoring traffic in certain networks in real-time. If at the time browsing the queue red means the bandwidth is already full, while if yellow means the bandwidth uses half of the quota has been granted, and for green means the bandwidth is free or idle.

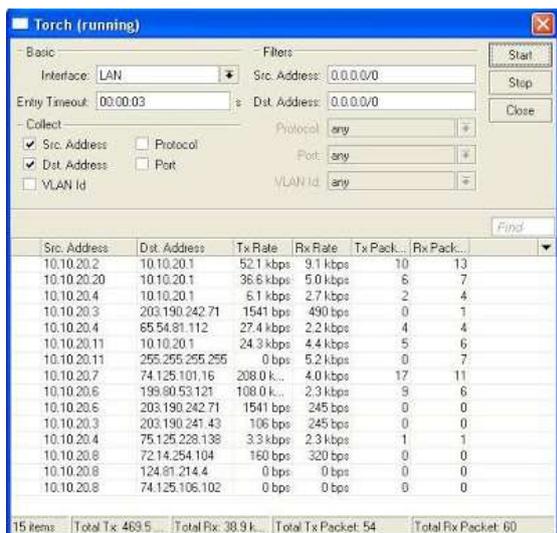


Fig. 10 Torch Menu

IV. CONCLUSION

It can be concluded that the use MikroTik in managing network traffic gains the user prosperity prevalent. Each user can use quotas effectively and efficiently. Hardware requirements are required for installation Mikrotik program is not too high when compared with providing one computer for managing the network. Mikrotik manage bandwidth use can increase the functional distribution of bandwidth to the clients in order to be more equitable distribution of bandwidth. All computers can use the internet with a smooth and stable despite all computers using the internet at the same time. All the parts of the computer unit gain bandwidth according to needs that have been determined. The Administrator shall have the easier job in controlling the bandwidth of not using MikroTik.

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