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Mikrotik Optimization and Pc Cloning on Computer Networks with Using UBIQU Satellite Internet Vsat Broadband

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Abstract

The internet is currently growing rapidly. The need and rapid development in the use of the Internet network requires a balance in the provision of Internet facilities. Internet standard services are the continuity of the connectivity of the Internet. Connections from the Internet are required to always be awake under any conditions, but not always connectivity will run smoothly, many obstacles or disturbances are encountered so that the connection does not run smoothly. One effective method that can be done is to apply the PCQ method in dividing the amount of internet bandwidth by paying attention to the distribution pattern of bandwidth speed based on the number of active users at a certain time. The subjects taken in this study were users who were active during the active period of students and other users in the Hotspot network at the Indonesian Institute of Technology and Business. The method used is a case study method based on the level of activity of the hotspot network on campus. Comparison between the amount of bandwidth for the number of users between the hours of high activity in the morning until the afternoon, and the hours of low activity in the afternoon until the evening. The PCQ method will divide the bandwidth based on the number of active users on the hotspot with the same amount. The design is continued by applying the PCQ method using Miktrotik Routerboard, testing is carried out by technical testing by testing the amount of bandwidth with division based on the number of active users and the same results are obtained.

Keywords: *PCQ, Bandwidth, Mikrotik*

1. Introduction

The development of the internet in Indonesia takes place rapidly. Based on a direct survey conducted by the Association of Indonesian Internet Service Providers (APJII), the number of internet users in Indonesia in 2017 was 143.26 million or equivalent to 54.68% of the total population of Indonesia [2]. Based on the survey, it is also known that internet user penetration in eastern Indonesia is still relatively low, where in Sulawesi province there are 48.70% of the population who already use the internet, followed by Maluku and Papua as much as 41.88%. This is because there are many areas that have not been reached.With the amount of data generated in the process required data analysis process. Big data analysis is the process of collecting, organizing and analyzing large volumes of data in order to find useful information or knowledge. One method to analyze big data is to use data mining. Data mining is the activity of extracting or mining knowledge from large / large amounts of data. One method in data mining is descriptive analysis method. Descriptive analysis is an analytical method that focuses on finding out what happened, where the existing data is processed to create a historical data set that can help uncover patterns that provide knowledge of what trends happened in the past. and give ideas about what might happen in the future. Based on the explanation above, this research will analyze the deep packet inspection data generated from the use of the internet by Ubiqu service users to obtain information and knowledge about the characteristics of its users.

So that with the acquisition of this knowledge, it can be used as material for evaluation and decision making for Ubiqu in the future, it can improve the quality of Ubiqu services.

2. Ease of Use

The concept of a computer network was born in the 1940s in America in a MODEL I computer development project at the Bell laboratory and the Harvard University research group. The project is led by professor H. Aiken. At first this project only wanted to use a computer device that must be used together. In the 1950s when the type of computer began to grow until the creation of super computers. At that time a concept was introduced to connect computers that were scattered with each other. The concept is the concept of time-based process distribution known as the Time Sharing System (TSS), so for the first time the form of a computer network was applied. In the TSS system several terminals (computers) are connected in series to a host computer. In the TSS process, a combination of computer technology and telecommunications technology began to appear, which initially developed separately.

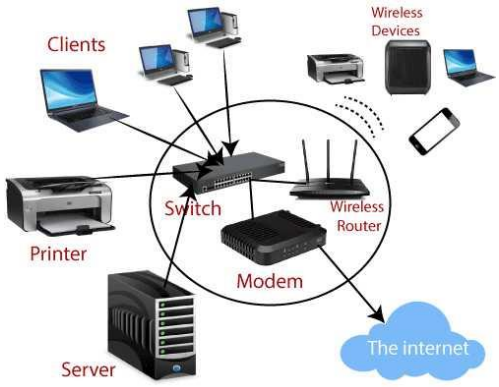

Figure 1. Computer Network Concept

Entering the 1970s, after the workload increased and the price of large computer equipment began to feel very expensive, the concept of distributed processing began to be used. As shown in Figure 3, in this process several host computers do a big job in parallel to serve several terminals that are connected in series to each host computer. In the distribution process, it is absolutely necessary to have a deep integration between computer technology and telecommunications, because apart from the processes that must be distributed, all host computers are required to serve their terminals in one command from the central computer.

The history of computers, the size of computer hardware, has grown rapidly from year to year. This is characterized by higher capabilities and smaller sizes. Currently, computers and their networks can handle the communication process between computers (Peer to Peer System) without going through a central computer. For that, start developing local network technology known as LAN. Similarly, when the Internet was introduced.

2.1. Model OSI

in everyday life to be able to communicate with people around the world, a standard language is used, namely English, then in the world of computers there is a world body that handles the issue of standardization, namely the International Standardization Organization (ISO). ISO makes standard rules known as Open Systems Inter-connection (OSI).

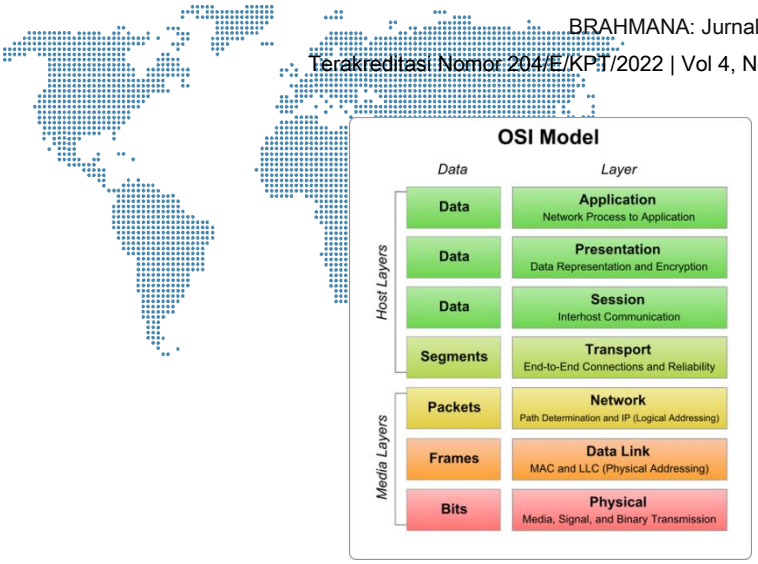

Figure 2. Open Network Reference Model

These standard OSI rules will then be used by companies that develop network devices to communicate with each other. OSI describes how data and information from an application on a computer across a network medium communicates to applications on another computer.

2.2. Definition of Mikrotik

Mikrotik itself is the name of a small company headquartered in Latvia, and was formed by John Trully and Arnis Riekstins. Around 1966, they both started with Linux and MS DOS operating systems and combined with technology based on wireless LAN or WLAN Aeronet with speeds up to 2 Mbps in Moldova. Then served about five new customers in Latvia. Over time, the basic principle of Mikrotik is not to make a wireless ISP (Internet Service Provider) anymore. However, it can create a router program that is reliable and can be run all over the country.

2.3. Mikrotik Functions

After knowing a brief history of Mikrotik, then we will discuss about the functions it has.

a) Provide Authentication System
   The first function is used to assist in blocking sites that contain content that is expressly prohibited by law. Thus, this program is very supportive of the creation of a positive internet as a first step in reducing content that is not in accordance with applicable regulations.
b) Local Network Configuration
   By using Mikrotik, you are able to manage and configure a LAN (Local Area Network) that uses a Mikrotik Router OS PC and lower specification hardware.
c) For Internet Network System Management.
   The third function is for a more centralized internet network so that administrators can manage and manage data better.
d) Act as Hotspot.
   The fourth fungus, also acts as a hotspot, where it will be very easy to configure and share bandwidth for each computer network. In addition, it also has the task of separating international and local data traffic bandwidth.
e) PPPoE Server Creation
   And the last function, which is used for devices in the creation of a PPPoE Servers.

2.4. Types of Mikrotik for Computer Network Needs

After knowing every function possessed by Mikrotik, the next step is to discuss the topic of this type of network operating system-based software which is divided into two main types.

1. Mikrotik RouterOS
   The first type is Mikrotik RouterOS, where the operating system used is UNIX-based and has advantages and also provides features ranging from router packages, bridges, firewalls, proxy servers, hotspots and so on. Simply by using an Operating System (OS), you can and are able to build your own router.
2. RouterBoard
   Previously, RouterOS used a software operating system, then RouterBoard is hardware developed by the Mikrotik company. RouterBoard is very small and more practical, then you can also perform the RouterOS installation process on a properly configured RouterBoard.

Figure 3. Routerboard Mikrotik

2.5. PC Cloning Introduction

PC Cloning is a modern computer technology that allows a Central Processing Unit (CPU) to be operated by more than one user at once. Usually a CPU can only be used by one user. With this PC Cloning technology, the paradigm of 1 CPU for 1 user has changed, so that 1 CPU can now be used, up to 20 users at once. PC Cloning Is a system that is applied to a computer network, used to transfer server hardware capabilities to all connected clients. PC Cloning works by utilizing maximum resources owned by a CPU, including: processor, memory, and hard drive. In principle, not all CPU resources are used optimally when a user uses a computer.

Figure 4. PC Clonning Network Model

2.6. Advantages of implementing PC Cloning

PC Cloning technology has several advantages including:

1. Save on software requirements.
2. Save on hardware requirements.
3. Save electricity consumption.
4. Save investment costs.
5. Easy PC maintenance.

2.7. Disadvantages of implementing PC Cloning

The application of PC Cloning is not without drawbacks, the drawback of PC Cloning is, if too many users are connected to the Server, it will cause the performance of the

Server to decrease. Therefore, it needs to be adjusted between the number of clients and server specifications.

2.8. Computer Performance

Computer performance is characterized by the large amount of work that can be done by a computer system compared to the time and resources used. Depending on the limitations, good computer performance can be measured based on one of the following:

1. Fast response time to run office applications and multimedia applications.
2. Low utilization of computing resources (percentage of processor usage when running office and multimedia applications) .
3. High availability of the computing system or application.
4. Fast or concurrent data compression and decompression.
5. High bandwidth / short data transmission time.

2.9. Understanding Big Data

The use of the term big data refers to the evolution of the use of technology that provides users with the right information at the right time from exponentially growing data sets over a long period of time in society. In addition, big data is also often described as a large volume of data, both structured data and unstructured data.

The big data phenomenon began in the 2000s at which time an industry analyst, Doug Laney, conveyed the characteristics of big data which consisted of three important parts, which include:

a. Volume
   Represents the amount of data generated, stored, and operated in the system. The increase in volume is explained by an increase in the amount of data generated and stored, but also by the need to exploit it.
b. Variation
   Representing the data collected has many different formats. Starting from structured data, numerical data, document data, email data, video, audio, and others.
c. Speed
   Represents the flow of data data that must be handled quickly and precisely which can be done through hardware or software.

2.10. Reverse DNS Lookup

Reverse DNS Lookup (rDNS) is one of the technologies found in the Domain Name System (DNS) which is useful for finding the domain name of an IP address. The translation process is carried out using PTR records, where in general the rDNS process can be used to trace the domain name to an IP address to identify the sender of spam emails, or the domain name of the computer that is trying to hack the system.

2.11. Ubiqu

Ubiqu is a VSAT Broadband satellite internet service developed by PT Pasifik Satelit Nusantara where ubiqu provides internet services using antenna transmitters that are available throughout Indonesia, especially for disadvantaged areas. Ubiqu is here as an internet connection solution for homes, schools, villages, clinics, health centers and others where there is no terrestrial communication network (cable, ADSL, fiber optic, radio, or GSM).

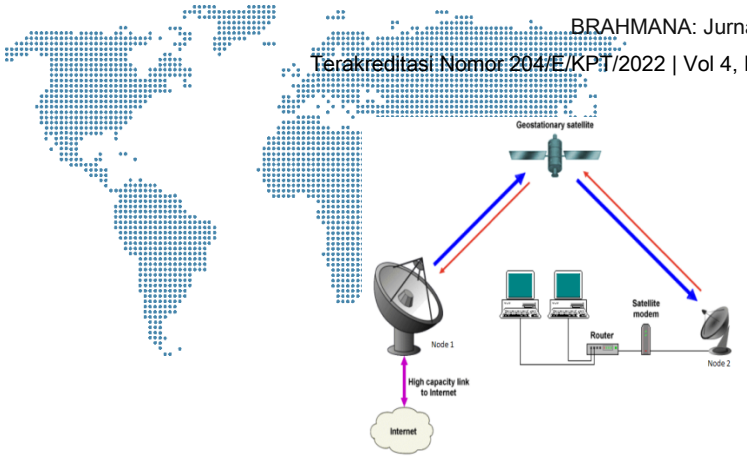

Figure 5 VSAT Network Design Concept

In its business process, Ubiqu provides a number of packages which are divided into FIT and BIG packages. The FIT package is a type of quota-based package consisting of FIT 1 which contains a quota of 8-14 GB, FIT 2 which contains a quota of 14 - 28, FIT 2 which contains a quota of 24 - 50 GB, and FIT 4 which contains 48 - 100 GB per month. depending on the area where it is installed. Meanwhile, the BIG package is an unlimited type of package with a Fair Usage Policy (FUP) or a quota with a reasonable usage limit, the BIG package itself consists of BIG 1 which contains a quota of 104 - 220 GB, BIG 2 which contains a quota of 166 - 370 GB, and BIG 3 which contains a quota of 320 - 680 GB per month depending on the region where it is installed.

In addition to the two packages, Ubiqu has another service called Ubiqu Signalku, Ubiqu Signalku is an internet access service through WiFi connectivity using satellite broadband access that can be installed anywhere throughout Indonesia. Ubiqu Signalku allows its users to open a WiFi internet business and can also develop the business of its users by renting out internet connectivity access to others. Meanwhile, the BIG package is an unlimited type of package with a Fair Usage Policy (FUP) or a quota with a reasonable usage limit, the BIG package itself consists of BIG 1 which contains a quota of 104 - 220 GB, BIG 2 which contains a quota of 166 - 370 GB, and BIG 3 which contains a quota of 320 - 680 GB per month depending on the region where it is installed.

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2.12. Deep Packet Inspection

Deep Packet Inspection (DPI) is a technology that allows an application or protocol to filter the network. DPI evaluates the data and headers in each packet on the network that is used to filter out protocols, spam, viruses, or various other disturbances specified on each existing network. In the working process, DPI performs filtering which is usually in a network where in the process DPI evaluates the content of each packet that passes through the firewall in accordance with the rules determined by the Internet Service Provider, or network administrator. In addition, DPI also determines what is done to packets on a network. In addition, DPI also works by checking packets up to the application layer at the OSI Layer to get information on the type of traffic. It is used to overcome various problems with identifying data packets based only on the port number of the packet.

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