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IMPLEMENTATION AND ANALYSIS OF MIKROTIK API MONITORING OF NETWORK USAGE

Ruri Ashari Dalimunthe[1*], Herman Saputra[2]
[1,2]Teknik Komputer, Sekolah Tinggi Manajemen Informatika & Komputer Royal
[3,4]Sistem Komputer, Sekolah Tinggi Manajemen Informatika & Komputer Royal
email: ruriashari1986@gmail.com

Abstract : At the SMK Negeri 1 Barumun, there are still shortcomings in monitoring net-work use where monitoring data is not stored in the database so that past network usage monitoring data cannot be displayed as new information to be used as evaluation material for network infrastructure at the school. For that reason, the researcher wants to research to solve the problems that exist in the school by building a new system, namely monitoring network usage. This system is built using the PHP programming language by utilizing the Mikrotik API as a liaison between the programming language and the Mikrotik device in retrieving the RX/TX data contained on the Mikrotik Router and then storing the monitor-ing data for network usage into a database, the database used is a MySql database. By im-plementing and testing the system, it can be concluded that the system has been able to solve problems in the field of information technology at the SMK Negeri 1 Barmun, namely monitoring network usage which can store monitoring data into a database and monitoring data can be used as material for evaluating network infrastructure for the bene-fit of the school.

Keywords: Networking, Mikrotik, Mikrotik API, Network Usage Monitoring

Abstrak: Pada Sekolah SMK Negeri 1 Barumun masih terdapat kekurangan dalam melakukan monitoring penggunaan jaringan dimana data monitoring tidak tersimpan kedalam database sehingga data monitoring penggunaan jaringan yang telah lalu tidak dapat ditampilkan sebagai informasi baru untuk dijadikan bahan evaluasi pada infrastruktur jaringan pada sekolah tersebut. Dengan alasan itu peneliti ingin melakukan penelitian untuk menyelesaikan masalah yang ada pada sekolah tersebut dengan membangun sistem yang baru yaitu monitoring penggunaan jaringan. Sistem ini dibangun dengan menggunakan bahasa pemrograman PHP dengan memanfaatkan Mikrotik API sebagai penghubung antara bahasa pemrograman dengan device Mikrotik dalam mengambil data rx/tx yang terdapat pada Router Mikrotik kemudian menyimpan data monitoring penggunaan jaringan tersebut ke dalam database, database yang digunakan merupakan database MySql. Dengan melakukan implementasi dan pengujian sistem, dapat disimpulkan bahwa sistem telah mampu menyelesaikan masalah pada bidang teknologi informasi di Sekolah SMK Negeri 1 Barumun yaitu monitoring penggunaan jaringan yang dapat menyimpan data monitoring kedalam database dan data monitoring dapat dijadikan sebagai bahan evaluasi infrastruktur jaringan untuk kepentingan Sekolah.

Kata kunci : Jaringan, Mikrotik, Mikrotik API, Monitoring Penggunaan Jaringan

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INTRODUCTION

The important role of information and communication technology is growing very rapidly until now along with the development of an increasingly modern and sophisticated era. The internet is now a staple in various aspects of the field. The internet does not only exist in urban areas, even in rural areas, the internet is something that is widely known. In fact, from all walks of life, the internet is needed to meet various needs both in terms of economic, social, educational, entertainment and even government.

The Barumun 1 State Vocational High School has an internet network, both a local network and an internet network. The problem that often occurs is the lack of management or monitoring of network usage at Barumun 1 Public Vocational High School. There is often a domination of bandwidth between clients or users caused by one or several The client downloads and uploads large files [1].

With so many needs for internet access at SMK Negeri 1 Baru, of course the need for internet bandwidth is very large to be accessible by all users including students so that network management is needed on the network infrastructure. Network management is the ability to control and monitor a network from a location [2]. To manage network infrastructure, a tool is needed, namely the Mikrotik Router. Monitoring is knowing the state of the status of a host [3].

Implementation and analysis of API proxy has been widely used in research or case studies in network monitoring including research with the title "API (Application Programing Interface) Mikrotik for authentication of the Siliwangi University academic system" [4].

Research with the title "Implementation of the Mikrotik API for Android-Based Router Management" Implementation was carried out at PT. Sigma Adi Perkasa [5].

Research with the title “Development of an Android-Based Network Monitoring Application” case study for the development of this monitoring application was carried out at the Puskom PSDKU Polinema, Kediri City [6].

Research with the title "Implementation of a Network Monitoring System Using Mikrotik Routers OS" This research was conducted at the Batik Islamic University of Surakarta [7].

Research with the title "Design and Implementation of a Wi-Fi Network Monitoring System Using Mikhmon Online" This research was conducted at Wisma Muslim Klitren Gondokusuman Yogyakarta [8].

Research with the title "Analysis and Implementation of an Internet Connection Monitoring System Using The Dude" This research was conducted at STIKOM Al Khairiyah [9].

Research with the title "Implementation of the Telegram Bot API for the notification system on The Dude Network Monitoring System [10].

Mikrotik which is made as a PC-based router (Personal Computer) is very useful for an ISP (Internet Service Provider) who wants to run several applications ranging from the lightest to the most advanced [11]. Mikrotik is also an operating system and software that is used to function the computer as a router [12].

A system is needed that can monitor whether internet access is stable, whether the use of internet access is sufficiently met by the total bandwidth available. The process of monitoring or

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monitoring is carried out on the Mikrotik Router. However, there are several deficiencies in this Mikrotik Router system which cannot meet the needs in monitoring network usage, such as recording the amount of network bandwidth usage per day or month, this is important because bandwidth requirements must be adjusted to the total usage of the entire infrastructure. network structure, so that if bandwidth requirements increase there will be no data on network usage records as a basis for submitting additional bandwidth requirements. The Application Programming Interface (API) allows users to create custom software solutions to communicate with RouterOS to gather information, customize configurations and manage routers [13].

It takes a system that is able to recapitulate network usage data and display it as new information, then the system can also display realtime network usage monitoring graphs.

METHOD

The method used in this study is a scientific method with the aim of obtaining information that will be used for research purposes. Methodology is a theoretical analysis of a method or procedure.

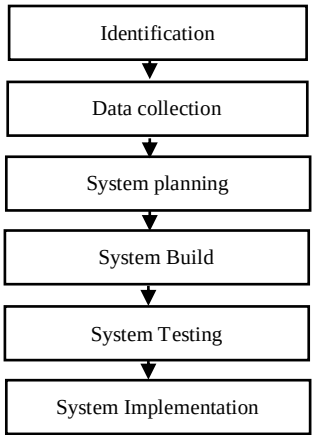

Image 1. Research Framework

The research framework above includes aspects

1. Problem identification, is the beginning of the process in this research, knowing that there is no system that can monitor network usage in the Information Technology Field of SMK Negeri 1 Barumun.
2. Data Collection. The methods used to collect data in this study included observing the research object, conducting interviews with staff/teachers or principals at SMK Negeri 1 Barumun and also studying literature.
3. System Design, After carrying out the process of identifying problems and finding solutions that are considered to be able to overcome existing problems and carry out data collection.
4. Making the system, after doing the design, then the system will be made based on that design. Create a database using MySQL.
5. System Testing, after the system has been created, the next process is to test the system. The first step for testing the system is deploying the system that has been created to the web server that has been provided at the school.
6. Application of the system, if the testing process is successful and it can be concluded that the system is running according to design, then the

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system is ready to be used at SMK Negeri 1 Barumun.

RESULT AND DISCUSSION

This study applies several steps in making a network usage monitoring system including first ensuring proxy access then CPanel login, designing databases, adding application data and testing the monitoring module.

Ensuring Mikrotik API Access

On the main proxy that is on the network infrastructure that will be monitored at the school, to ensure that the router router can be accessed via the API, we can view and configure services on the proxy. To make it easier to configure, Winbox is needed as the user interface. The first step is to log in using the IP address, then enter your username and password, then click the connect button..

When you have successfully logged in, just select the IP menu and then click the Services sub menu on the side menu on the Winbox display. Then the IP Service List dialog box will appear which displays the list of services available on the proxy router. On the user interface, we can see from the image below that if the service is not active (disabled), there will be a cross icon and gray writing, if in this condition we cannot access the proxy router through the service the. Make sure the service we need (api) is active (enabled), if the service we need (api) is disabled, click the service in question then click the tick icon.

Image 2. Enter the proxy with winbox

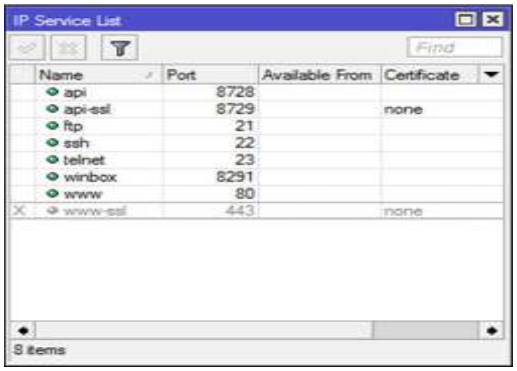

Image 3. IP Service list

Login CPanel

To be able to manage hosting and implement the proposed system, namely by using cpanel. The first step to using cpanel is to log into cpanel with the trafmon.smknegeri1barumun.go.id link using the username and password that was determined by the previous school.

Image 4. *Dashbord CPanel*

Use the file manager feature on cpanel to manage source code or make changes to source code.

Database Design

The first step in designing a data-

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base is to create a new database on cpanel, we can click on the mysql database menu then enter the name of the database that we will create here the author created the trafmon_db database.

The database that was successfully created on the trafmon database:

Image 5. *Database trafmon_db*

Next is to create a new user for access to mysql, by entering the username trafmon_user then the author enters the password then clicks the Create User button. After successfully creating a new user, the next step is to delegate the database that was created earlier to the user that was also just created earlier, this means that the user can access the database. The first step is to go to the Add User To Database form, then select the user, then select the database, then click the Add button.

After successfully creating a new database and user, the next step is to design the database, using phpmyadmin on cpanel to design the database.

Adding Application Data

So that the system can be integrated into e-government service applications by implementing SSO (Single Sign On), the first step in the service application is to input the proposed system website data according to the form as shown below.

Image 6 . Add Website Data

Display of website/application data and trafmon application data has been successfully created as shown in figure 7 below.

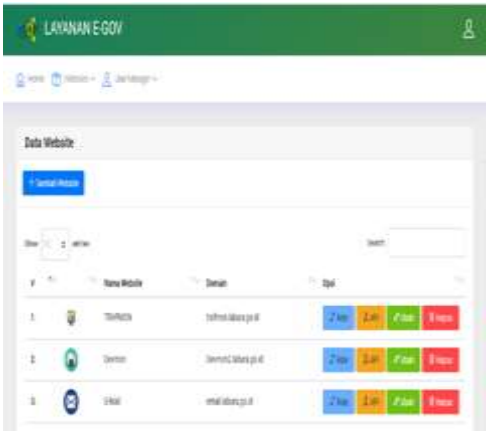
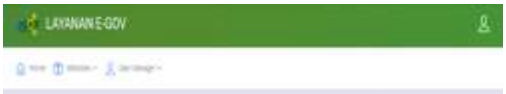


Image 7. Trafmon application data that is made

Testing the Network Device Module

A network device page that displays network device data whose function is to test the connections of existing network devices on the network infrastructure. The goal is to make it easier for



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network technicians (users) to test network device connections/or monitor network device connections.

For testing the user can click the "Test Connection" button to test the intended network device connection, if you want to test all network devices the user simply clicks the "Check All Connections" button then the system will check the connections of all network devices in a queue.

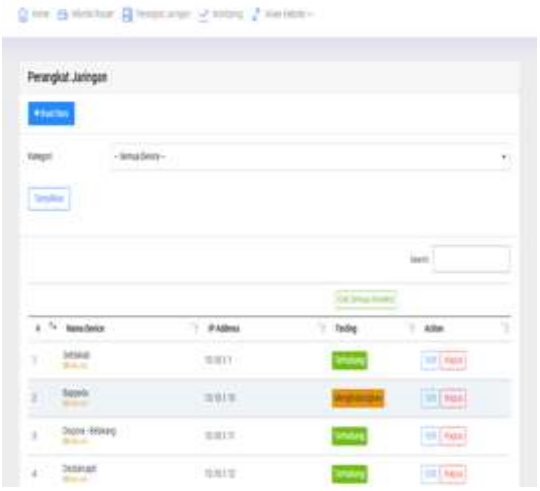

Image 8. Network Device

Testing the Monitoring Module (Output)

Monitoring data page, is a page that displays a summary of the results of monitoring network usage. There is a filter that can be adjusted for recapitulation at a specified time. For testing, the user selects the recap field in the filter, whether to display a recapitulation based on a month or year according to the date specified in the month and year fields, then press the filter button, then the data will be displayed in graphs and tables. In the table there are several buttons that have the function to print data to pdf or print.

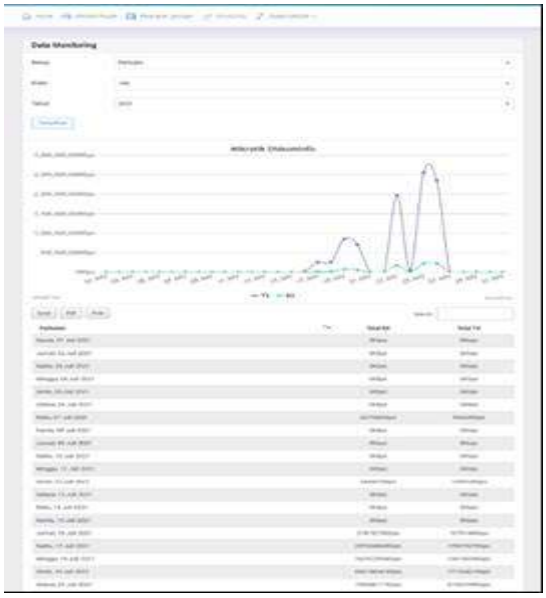

Image 9. Output PDF

CONCLUSION

Authentication/login using Single Sign On (SSO) which is integrated with E-Government service applications, so users don't need to remember multiple ac-counts Simply log in with 1 service web-site account then you can access the trafmon application. Monitoring network usage in real time. Network usage monitoring data is stored in the database so that it can be recapitulated and displayed again.

Trafmon system that requests data through the Mikrotik API in real time, then it is enough to increase the performance of the proxy that processes requests for data from the Mikrotik API. Even so, the process doesn't really burden the proxy router itself.

The network usage monitoring system can run well on a server that has been provided by the agency which was built using the PHP programming language and integrated with the service system at the agency using the Single Sign On scheme.

The system server can retrieve realtime network usage information on the proxy router where the executing program is a cron job by utilizing the Mikrotik API as a communication bridge between the PHP programming language and the router proxy as well as storing network usage data into the database and displaying it as new information.

The use of a network usage monitoring system has met the needs of employees/users in monitoring network usage in realtime (current time) where the usage data is also displayed with realtime graphics. Network usage data stored in the database can also be displayed properly. There is also a filter feature where users can filter data when it will be displayed. Then the user can also print a network usage data report according to the desired filter so that the report can be used as a support for adding bandwidth or as evaluation material for the network infrastructure.

From several conclusions, there are also material considerations including: In realtime network usage data storage into the database takes up quite a large amount of storage, this is because the data is taken in seconds and then the data is directly stored in the database so that the usage is quite large. It is recommended that network usage data is not stored in the database entirely, but only 1 data is stored per day. After calculating the total network usage, the data for one day will be deleted and only the last data will be left.

Make it easy for users/technical personnel to quickly find out if at any time the Mikrotik router is off, it is recommended that there be a reminder that the monitored Mikrotik router is not connected which then sends notifications to users via e-mail, SMS gateway or also whatsapp gateways.

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