



The Design Of Network Monitoring System Using SNMP Protocol With Telegram Notification

Design and Build a Network Monitoring System Using a Protocol SNMP With Telegram Notifications

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ABSTRACT

One of the network monitoring systems is that it can use the SNMP protocol using Nagios. Nagios is an open source application for monitoring and has many plugins, one of which is via Telegram. Where reports on monitoring results can be sent via Telegram in real time. This SNMP protocol has many features such as IP address-based relationships, can exchange data, configure other devices, monitor the network, monitor other devices. With the many features and capabilities of the SNMP protocol, this protocol can be used in monitoring networks. From a series of tests carried out by the network monitoring system using the SNMP protocol with telegram notifications running well, according to the design and configurations applied. Starting from the installation of the Linux ubuntu server, LAMP Server (Apache2, PHP and MySQL) and the Nagios Core System, then login to the Nagios core system, after successfully logging in a dashboard page appears which can be used to display network monitoring results in real time.

ABSTRACT

One of the network monitoring systems that use SNMP protocol using Nagios. Nagios is an open source application for monitoring and has many plugins, one of which is through Telegram. Where the monitoring results report can be sent via Telegram in real time. This SNMP protocol has many features such as IP Address-based relationships, can exchange data, configure other devices, monitor networks, monitor other devices. With the many features and capabilities of the SNMP protocol, this protocol can be used for network monitoring. From a series of tests carried out by the network monitoring system using the SNMP protocol with telegram notifications running well, according to the design and configurations implemented. Starting from the installation of linux ubuntu server, LAMP Server (Apache2, PHP and MySQL) and the Nagios Core System, then login to the Nagios core system, after successfully logging in, a dashboard page appears that can be used to display network monitoring results in real time...

INTRODUCTION

The many conveniences that are obtained by internet users make this technology develop very rapidly. Almost every aspect of information can be collected via the Internet, from education, entertainment, sports, government, schools and much more. Computer networks must maintain operational stability, using network monitoring.

The development of this network monitoring uses the resources available in the system

computer network in the most efficient and effective way possible. However, the use of this network monitoring system has not been carried out on the nadifa.com network server.

In a network there is a network protocol that is commonly used, namely the Simple Network Management Protocol (SNMP). . With the many features and capabilities of the SNMP protocol, this protocol can be used in monitoring networks.

Based on observations made on Nadifa.Com, several problems can be found where clients cannot change their own passwords, there is no network monitoring facility that functions to monitor network conditions and connected devices. Usually to handle problems on the network can only be known based on user reports to the administrator, especially if an administrator is not at the location, which makes it long to deal with problems on the network.

One of the network monitoring systems is that it can use the SNMP protocol using Nagios. Nagios is an open source application for monitoring and has many plugins, one of which is via Telegram. Where reports on monitoring results can be sent via Telegram in real time.

THEORETICAL BASIS

Definition of Design Design

is the depiction, planning, and sketching or arrangement of several separate elements into a unified whole and functioning (Mulyati, 2018: 30).

Design is an activity of translating the results of the analysis into hardware or tools that are better than what already exists (Rafli, 2021:29).

From the two definitions above, it can be concluded that design is the depiction, planning, and sketching or arrangement of several elements into the form of hardware or tools that are better than what already exists.

Definition of Monitoring

Monitoring is a monitoring process that is supported by collecting and analyzing information on a regular basis so that work or activities comply with the rules and do not go off track (Nasir in Sumarni, 2020:18).

Monitoring is a continuous assessment of the function of project activities in the context of implementation schedules and of the use of project inputs by groups in the context of design expectations (Syihabuddin, 2020:18).

Monitoring is knowing the state of the status of a host. Monitoring computer networks in this study aims to monitor the state of the client computer and the services running on it, such as knowing when the client computer is on (up) or off (down), (Widodo, 2018: 2).

From the three definitions above, it can be concluded that monitoring is a monitoring process to find out the status of a host, such as knowing when a client computer is on (up) or off (down).

Computer network

A computer network is a telecommunications network that allows computers to communicate with each other by exchanging data (Rendro, 2020: 110).

Computer network is a group of autonomous computers that use each other communication protocols through communication media so that they can share data, information, programs



applications and devices such as printers, scanners, CD Drivers or hard drives, and make it possible to communicate with each other electronically (Hasibuan, 2021:31).

The definition of a computer network is an operating system consisting of several computers and other network devices that work together to achieve a common goal (Pelealu, 2020:5).

Based on the understanding of computer networks above, the authors conclude that a computer network is a group of computers that communicate with each other by exchanging data electronically.

In computer networks there is a network topology, topology or network architecture is a pattern of relationships between terminals in a computer network system. Network topology is a term used to describe how computers are connected in a network (Khasanah, 2016:12).

Network topology describes the structure of a network or how a network is designed. In the definition, topology is divided into two, namely physical topology which shows the physical position of the cable installation and logical topology which shows how a medium is accessed by the Host (Yulianeu & Wahab, 2017: 52).

RESEARCH METHODS

The research method used is experimental research. Research with an experimental approach is a study that seeks to find the influence of other variables under controlled conditions. The research method used in this study is to use the direct experimental method to build a network monitoring system using the SNMP protocol with telegram notifications on nadifa.com.

RESULTS AND DISCUSSION

Monitoring

Testing Results and Monitoring Results and Notifications Testing

is carried out by directly monitoring the nadifa.com network, while the tests include:

1. In testing the connection between *the monitoring server* and the Nadifa.com network, it works according to plan, namely *a server with a Nagios core system* as monitoring can do it. As can be seen in the image display below:

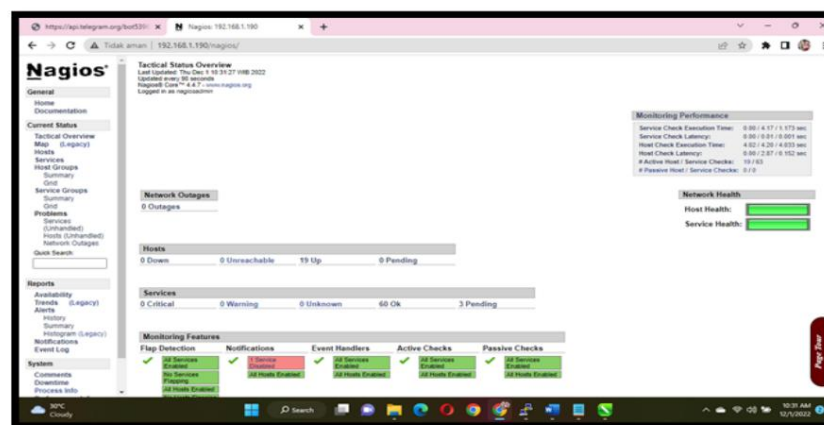


Figure 1 Display of the Technical Status Overview

From the picture above it can be seen the results of network monitoring, 19 hosts connected to the network, consisting of 1 server, 1 router, 7 access points and 10 clients, as shown in the map below:

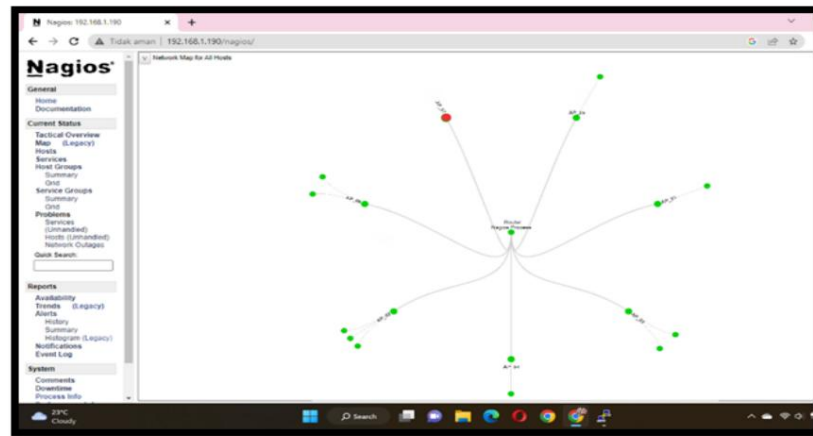


Figure 2 Display Network Map Overview

From the map above, it can be seen in the results of network monitoring that nadifa.com has 1 router with 7 access points, each access point will be connected to a client. *Access points* that are *down* are marked with a red image color and those that are *UP* are green, while for clients if they are down they will disappear from the map view.

2. In monitoring *the resources* of *clients* connected to Nagios, it is regulated via the configuration given, the configuration snippet is: `define service {`

```

use                generic-service
host_name          clien_01
service_description Load average
check_command       check_nrpe!check_load}

```

From the script (configuration) above, it produces *monitoring* results like the image below:

Host	Status	Last Check	Duration	Status Information
AP_01	UP	11-21-2022 19:24:11	46 19s 562s	RNG OK - Packet loss = 0%, RTT = 1.88 ms
AP_02	UP	11-21-2022 19:24:31	46 19s 25s 29s	RNG OK - Packet loss = 0%, RTT = 5.36 ms
AP_03	UP	11-21-2022 19:24:50	46 19s 15m 24s	RNG OK - Packet loss = 0%, RTT = 4.63 ms
AP_04	UP	11-21-2022 19:26:05	46 19s 17m 58s	RNG OK - Packet loss = 0%, RTT = 3.43 ms
AP_05	UP	11-21-2022 19:26:24	46 19s 17m 34s	RNG OK - Packet loss = 0%, RTT = 5.53 ms
AP_06	UP	11-21-2022 19:26:13	46 19s 17m 54s	RNG OK - Packet loss = 0%, RTT = 2.38 ms
AP_07	UP	11-21-2022 19:26:36	46 19s 16m 44s	RNG OK - Packet loss = 0%, RTT = 3.18 ms
cli001	UP	11-21-2022 19:27:56	46 19s 16m 19s	RNG OK - Packet loss = 0%, RTT = 3.05 ms
cli002	UP	11-21-2022 19:23:09	46 19s 15m 54s	RNG OK - Packet loss = 0%, RTT = 5.23 ms
cli003	UP	11-21-2022 19:25:36	46 19s 15m 29s	RNG OK - Packet loss = 0%, RTT = 19.59 ms
cli004	UP	11-21-2022 19:23:18	46 19s 15m 1s	RNG OK - Packet loss = 0%, RTT = 2.54 ms
cli005	UP	11-21-2022 19:23:43	46 19s 14m 36s	RNG OK - Packet loss = 0%, RTT = 2.88 ms
cli006	UP	11-21-2022 19:23:59	46 19s 14m 23s	RNG OK - Packet loss = 0%, RTT = 1.48 ms
cli007	UP	11-21-2022 19:24:16	46 19s 14m 1s	RNG OK - Packet loss = 0%, RTT = 4.89 ms
cli008	UP	11-21-2022 19:24:33	46 19s 13m 49s	RNG OK - Packet loss = 0%, RTT = 5.25 ms
cli009	UP	11-21-2022 19:24:48	46 19s 13m 33s	RNG OK - Packet loss = 0%, RTT = 5.05 ms
cli010	UP	11-21-2022 19:25:05	46 19s 13m 16s	RNG OK - Packet loss = 0%, RTT = 3.42 ms

Figure 3 Display of Current Network Status 3.

Results of *resource* monitoring on the trip used



Some of the devices used on the nadifa.com network include *servers* (operating system linux ubuntu server 20.04), *access points* and *proxy routers*.

Monitoring results with the *host* status in the UP position, ping OK (*packet lost* = 0% and RTA = 0.05) and *latency* = 4,098 Seconds, which can be said the network on the device is stable and the connection is good. As for the *proxy router resource* (RB751U-2HnD), namely the use of 5.5 MB of *memory* and 15% of the resource, as can be seen from the image display below:

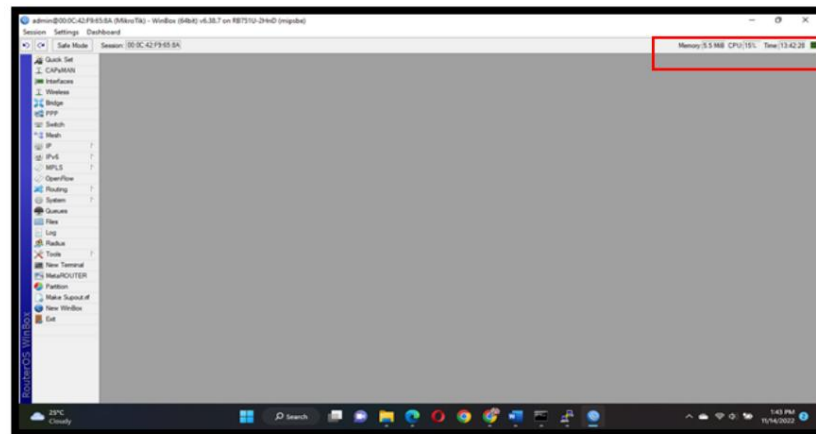


Figure 5 Display of Mikrotik Router Status via Winbox

4. In sending notifications to Telegram, Nagios utilizes Telegram bots via the Telegram API, as shown in the image below:



Figure 6 Display of Active Telegram API BOT

5. The system (especially through the RT/RW Net home login) performs a *password change* performed by *the client* can only be done on the *internal network*.

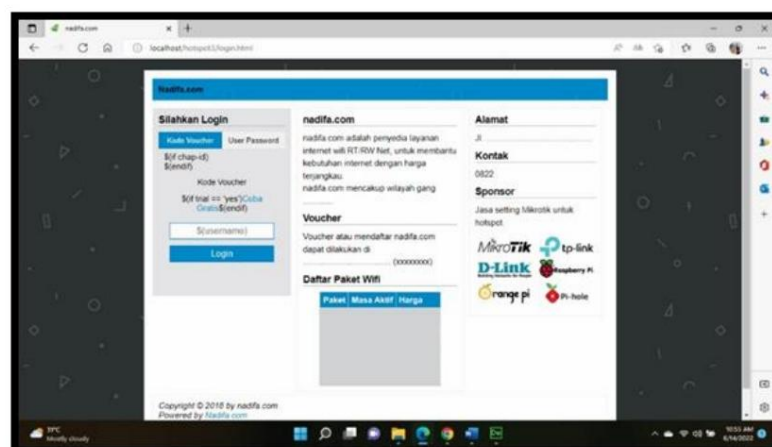


Figure 8 Display of the Nadifa.com Login Page

From a series of tests, the results can be seen in the table below this:

Table 1 Test Results

No	Component Testing	Test result	Information
1.	Test the connection between the monitoring server and the Nadifa.com network	Nagios can monitor the network <i>UP</i> or <i>DOWN</i> , which is done by using the PING command, if the reply is UP and if it is unreachable.	Server with the Linux Ubuntu Server 18.04 operating system, using Nagios can monitor the network on nadifa.com
2.	Doing remotes to nadifa.com devices connected to the network	Did a <i>remote</i> network (<i>server</i>) through putty, and it worked fine. However, remote access point devices cannot be done from outside networks (Public IP).	Can perform <i>remote</i> on the server, such as restarting. However, <i>remote</i> access to the access point cannot be done because it does not have a <i>static</i> IP address on each device (<i>access point</i>).
3	Monitoring the resources of connected clients	notification of server, hdd memory usage (information displayed such as: <i>Ping</i> , <i>Disk</i> , <i>Memory</i> and Total Process	Nagios can monitor the resources of connected clients, which are displayed in general and in detail.
4.	Sending notifications to telegram about network conditions	Successfully sent a notification to telegram regarding the connection of status the access point and client, using the ping command to find out the reply or time out. If the reply is considered the client is connected (if RTA < 100 MS = Normal and RTA > 100 MS Critical)	In sending telegram notifications, Nagios makes use of telegram bots. The speed of sending monitoring information is also affected by the conditions of the cellular network used
5.	The ability of the system (especially through the RT/RW Net home login) to change passwords by the client	Success in changing the password by the user of the Nadifa service through the internal Nadifa network which is marked by a successful password change . Users can only change the password.	Users can change their own passwords at the RT/ RW Net nadifa.com home login by clicking the user password button According to the design



CONCLUSIONS AND RECOMMENDATIONS

Conclusion

1. By implementing a network monitoring system using the snmp protocol with telegram notifications on nadifa.com, it will help the work of nadifa.com, especially technicians, in terms of monitoring network conditions and network users.
2. A network monitoring system using the SNMP protocol requires additional devices, including a server computer to run the Nagios core system, so the response speed provided by the server depends on the specifications of the device used.

- Suggestions
1. Design a better web (network login page), with more complete facilities.
 2. The RT/RW Net network monitoring system using Nagios can be developed by using cloud proxy as a router.

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