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Implementation Of Network Device Monitoring System Using SNMP Protocol With Email Notification At Smk N 2 Seluma

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Abstract: SMK N 2 Seluma currently has a network and is also connected to the internet network, the computer network is used for teaching and learning activities for students and the work of teachers and education staff, the SMK N 2 Seluma computer network still often occurs disturbances in devices that support networks such as access points (often laptop users connect for a long time and even cannot connect to the network). This research aims to monitor network devices using the SNMP protocol on the SMK N 2 Seluma computer network. The research used an experimental method. In monitoring devices on the SMK N 2 Seluma computer network using the SNMP protocol found in the Nagios application. Nagios monitors devices on the network such as connected or not connected, device memory, device storage (HDD) and other monitoring. In monitoring devices on the network Nagios works well, which can monitor according to the script configured on the main Nagios Core system. For notifications will be sent via email that has been set (admin email) in the form of device down conditions. With the monitoring system using the SNMP protocol, it will make it easier for admins to perform maintenance on the network.

Keywords: SNMP, Nagios, Network Monitoring

Introduction

The many conveniences obtained by internet users make this technology grow very rapidly(Hameed et al., 2022). Almost every aspect of information can be gathered through the internet, ranging from education, entertainment, sports, government, schools, and more(Barker et al., 2019). Computer networks must maintain operational stability, using network monitoring(Abbasi et al., 2021). The development of this network monitoring uses the resources available in the computer network system in the most efficient and effective way possible(Peng & Wu, 2021). However, the use of this network monitoring system has not been carried out on the network server of SMK N 2 Seluma(Kadhim et al., 2020). In a network there is a commonly used network protocol, namely the Simple Network Management Protocol (SNMP), this SNMP protocol has many features such as, IP Address-based relationships, can exchange data, configure other devices, monitor

networks, monitor other devices(Mahadevia et al., 2020). With the many features and capabilities possessed by the SNMP protocol, this protocol can be used in network monitoring(Choi et al., 2020). Currently, SMK N 2 Seluma can only find out through user reports. One of the problems that SMK N 2 Seluma has is that it is not or has not been able to find out how many devices are connected, clients that are overloaded with full memory or resources, this is due to prolonged use or too many connected users and no reports (network and user conditions) periodically and in real time. One of the network monitoring systems can use the SNMP protocol(Sharma et al., 2021). Where the monitoring report can be sent via email in real time(Ageyev et al., 2022).

Methodology

The research method used is experimental research. Research with an experimental approach is a study that seeks the influence of other variables under controlled conditions(Khasanov et al., 2021). The research method carried out in this study is to use direct experimental methods to build a network monitoring system using snmp protocol with email notification at SMK N 2 Seluma(She, 2020).

Result and Discussion

Result

From a series of tests carried out, the network monitoring system using nagios with telegram (Lamego et al., 2022)notifications runs well, in accordance with the design and configurations applied(Lu et al., 2020). 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, where nagios through the snmp protocol can monitor Ping (Connection), Disk or Root Partition (Storage), Swap (Memory) and Total Processes(Philip et al., 2021). The display of the results of monitoring the network status carried out by nagios are(Al-Ali et al., 2021):

1. SNMP protocol in monitoring devices connected to the network

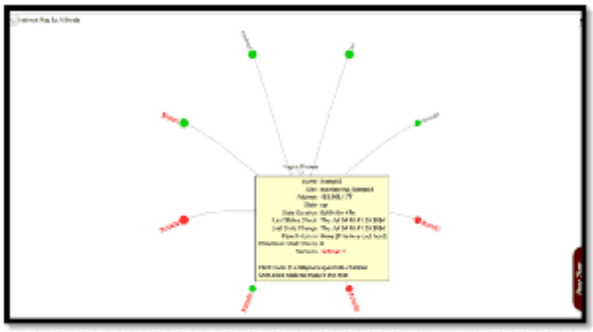

Figure 1. Client Monitoring Results

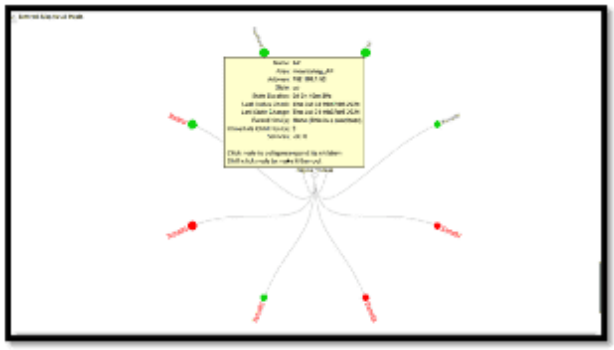

Figure 2. Access Point Monitoring Results

2. SNMP protocol in monitoring the resources of devices connected to the network

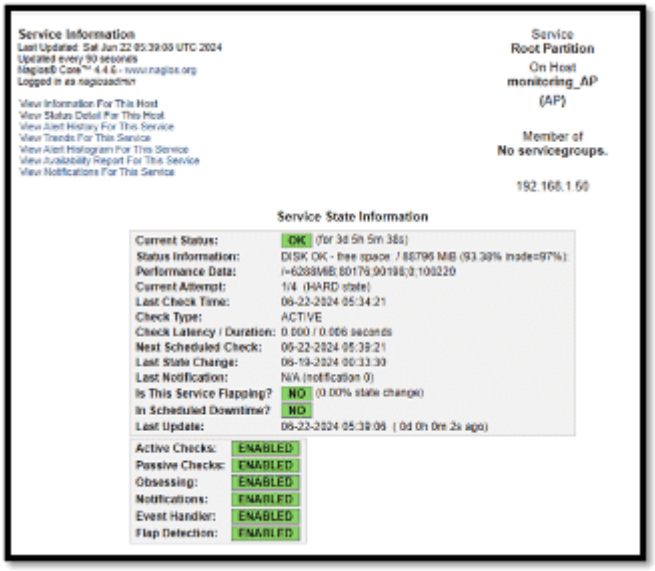

Figure 3. HDD Monitoring Results

Figure 4. Memory Monitoring Results

3.SNMP protocol in monitoring the condition of devices (On/Off) connected to the network

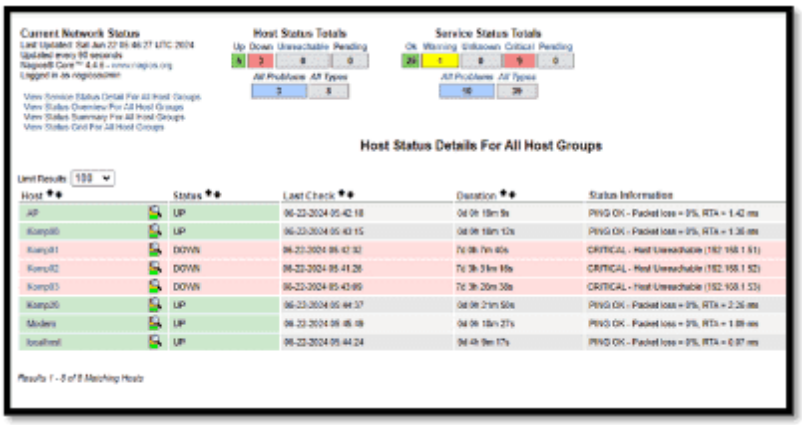

Figure 5. Device Status Monitor Results on the Network (Host)

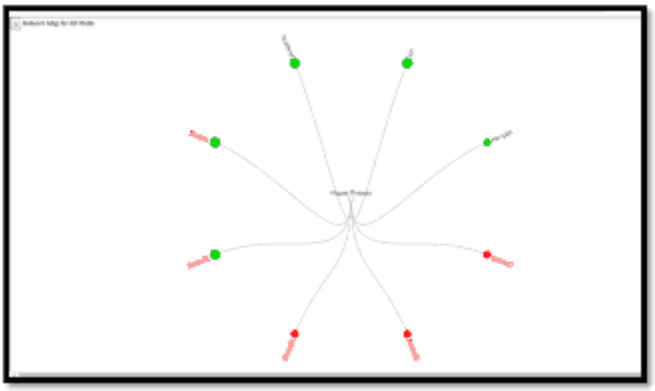

Figure 6. Device Status Monitor Results on the Network (Map)

4.Linux ubuntu server 20.0 in running the SNMP protocol for network monitoring

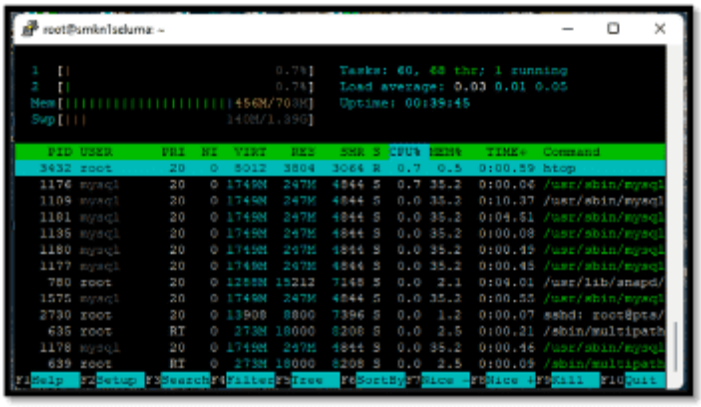

Figure 7. Server Resource Usage with the htop command

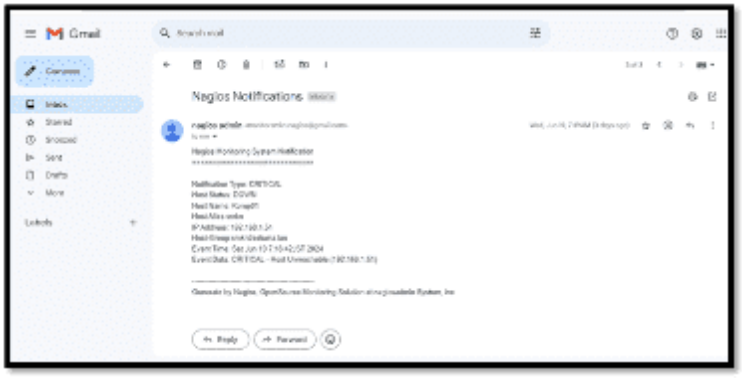

Figure 8. Email Notification Results

Discussion

Table 1. Discussion

No	Testing Instrument	Result	Desc.
1	The ability of the SNMP Protocol to monitor devices connected to the network, including: a. Client computer	Client computers connected to the network can be monitored, as for what is monitored in the form of services on the network. Of the 9 services monitored, there are 2 services that are dead or inactive, namely HTTP and SSH.	Good
	b. Access Point	Access Points connected to the network can be monitored, as for what is monitored in the form of services at the access point. Of the 9 services monitored, all are running	
2	The ability of the SNMP Protocol to monitor the resources of devices connected to the network a. Memory	SNMP protocol through nagios is successful or can monitor memory on the device, such as the results of monitoring memory on the access point, which is 91% remaining.	Good
	b. HDD	SNMP protocol through nagios is successful or can monitor memory on the device, such as the results of monitoring memory on the access point, which is 93% remaining.	

No	Testing Instrument	Result	Desc.
3	The ability of the SNMP Protocol to monitor the condition of devices (On / Off) connected to the network	In monitoring the life and death of devices connected to the network can be done in 2 ways, namely through the current status - host and can also be done through maps. Of the 8 devices monitored, there are 3 devices in a dead condition and 5 devices in a live condition.	Good
4	The ability of linux ubuntu server 20.0 to run the SNMP protocol to monitor the network	Linux ubuntu server in monitoring the network using SNMP protocol through Nagios runs very well, because of the use of a small CPU load (less than 5%) and a small memory of 50%.	Good

Conclusion

The conclusions that can be drawn after implementing a network monitoring system using the snmp protocol with e-mail notification are as follows:

1. With the implementation of a network monitoring system systemsystem using snmp protocol with e-mail notification at SMK N 2 Seluma, it will help the work of SMK N 2 Seluma, especially technicians in terms of monitoring the condition of the network.will help the work of SMK N 2 Seluma, especially technicians in terms of monitoring network conditions and network users.network and network users.
2. Network monitoring system using snmp protocolsnmp protocol requires additional devices, including a server computerto run the core nagios system, so that the speed of theresponse provided by the server depends on the specificationsdevice used.

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