



Jurnal Komputer, Informasi dan Teknologi Vol: 4, No 1, 2024, Page: 1-8

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

Pauzan Sakti*, Sapri, Abdussalam Al Akbar

Universitas Dehasen Bengkulu

DOI: https://doi.org/10.53697/jkomitek.v4i1.17 32 *Correspondence: Paujan Sakti Email: pauzansakti37@gmail.com

Received: 18-06-2024 Accepted: 21-06-2024 Published: 29-06-2024



Copyright: © 2024 by the authors. Submitted for open access publication under the terms and conditions of the

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

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).

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).

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

Current Network : ant Updated Sut An 2 Splated enviro 90 record Reports Core ** 4.4 & Inggord is as registerin Verv Sonice Status D Verv Status Corenter/ Verv Status Corenter/ Verv Status Corenter/ Verv Status Core For	Stature 27 Bit die 27 Liffic 2004 nde unsechleptiscorg wei Fer All Hoot Genups Fer All Hoot Genups Fer All Hoot Genups al Hoot Genups	Host Status Totals Up Down Unractatie Pending Al 2 0 0 Al Poblem AS Types 2 3	Service Status Totals On Warring Statusen Catal Per 28 1 8 9 Alt Prochems All Pare 29 29	aling 0				
Host Status Details For All Host Groups								
Host **	Status **	Last Check **	Outation **	Status Information				
	10 m		And And Allow Re-					
49-	- UP	00-22-2024 05:42:10	VE VE 10/1 98	PING OK - Packet lose = 0%, RTA = 1.42 ms				
kP Kampdió	2 up	06-23-2004 05 42 18 06-23-3004 05 42 15	Od OR 18m 12k	PRVG CK - Packet Ices = P5, RTA = 1.42 ms PRVG CK - Packet Ices = P5, RTA = 1.35 ms				
er Campiliti Campiliti	Le Le Down	06-23-2024 05-42-18 06-23-2024 05-43-15 06-23-3024 06-43-12	de de tilen 12% Re de hien eds	Physic DK - Packet loss = PS, RTA = 1.42 ms Physic DK - Packet loss = PS, RTA = 1.35 ms CRITICAL - Rest Unerachable (182 158 1 51)				
kP Kampiliti Kampiliti Kampiliti	E DOWN	06-23-3504 05-42-18 06-23-3504 05-43 15 06-23-3504 06-43 12 06-23-3504 05-41 26	04 04 1541 54 04 04 1541 124 74 05 741 405 74 35 3141 155	PING DK - Packet loss = PS, RTA = 1.42 ms PING DK - Packet loss = PS, RTA = 1.36 ms CRITICAL - Hast Userachable (152 155 1 52) CRITICAL - Hast Userachable (152 155 1 52)				
kiP Kumpili Kumpili Kompili Kompili	Down	06-23-3024 45 42 18 06-33-3024 05 42 15 06-23-3024 05 42 12 06-23-3024 05 41 28 06-23-3024 05 41 28	Cost de titer se Cost de titer 12a To de Ten dos To 36 31m 10a To 36 31m 10a	PING OX - Packet Ioan - 975, RTA + 1-4 mm PING OX - Packet Ioan - 975, RTA + 1-31 mm CRITICAL - Heat University of RE 181 151 CRITICAL - Heat University (ISE 1851 152) CRITICAL - Heat University (ISE 1851 152)				
AP Kanpili Kanpili Kanpili Kanpili Kanpili	S DOWN	06-23-3024 (5) 42-16 06-23-3024 (6) 43-15 06-23-3024 (6) 47-15 06-23-3024 (6) 47-36 06-23-3024 (6) 47-36 06-23-3024 (6) 49-37	Gel de talen ton Gel de talen ton Fiz de Pan dos Fiz de San Bas Fiz de Zem Sas Gel de 2nm Sas	PING ON- Packet Iose = 75, RTA = 1.42 ms PING ON - Packet Iose = 75, RTA = 1.31 ms CRITICAL - Next Unexcitable (152 THI 1.51) CRITICAL - Next Unexcitable (152 THI 1.51) CRITICAL - Next Unexcitable (152 THI 1.53) PING ON - Packet Iose = 75, RTA = 2.23 ms				
AP Kampili Kampili Kampili Kampili Kampili Madem	Li ur Li ur Li ur Li ur Li ur Li ur Li ur	06-23-2024 (25 42 18 06-23-3024 (25 42 15 06-23-3024 (25 41 25 06-23-3024 (25 41 25 06-23-3024 (25 41 25 06-23-3024 (25 44 37 06-23-2024 (25 46 35)	ou on termin ou de tien tox he de he sos he de he sos he de he sos de de terminos de de terminos	PHO DV - Pacet tox = 7% KTA + 1-0 mm PHO DV - Pacet tox = 7% KTA + 1-1 2 mm CRTEC4L - Heat Unexcharge (151 %1 1 %1) CRTEC4L - Heat Unexcharge (151 %1 1 %1) CRTEC4L - Heat Unexcharge (151 %1 1 %1) PHO DV - Pacet tox = 7% KTA + 2 % mm PHO DV - Pacet tox = 7% KTA + 2 % mm				





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

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

🗿 root®	smkn1selun	18:~									-	D	×
1 [2 [Nem[Swp[1456N/ 140M/1	0.7%] 0.7%] 703M] .396]	Task Load Upti	ar ar	60, Vezag : 00:	68 t3 e: 0. 39:45	c; 1 run 03 0.01	ning 0.05		
PID	0389	PRI	NI	VIRT	REE	5HR	3	CPU%	122314	TIME+	Comman	d.	
3432	root	20	0	8012	3804	3064	R	0.7	0.5	0:00.59	htop		
1176						4044		0.7	35.2	0:00.06		dbin/mg	2.01
						4844					/usr/s	bin/my	mq1
1101						4844				0:04.51			100
						4844							act.
1180		20				1844			35.2	0:00.45		din/mg	aql
						4844			35.2	0:00.45			aql
780	root				15212	7145				0:09.01	/usc/1	ib/ans	ipd/
						4244							rang1
2730	1001	20		13908	8800	7396				0:00.07	sshd:	200585	vsa/
635	2002	RI			18000	8208				0:00.21	/sbin/	multip	ath
1178		20			247M	1811			35.2	0:00.46			aql
639	YOOT	RT			18000	8208			2.5	0:00.05			3
Help	Setup	23Seaze	:h	filter	T Izee	2650	isti	Hy sta	itce -	SENice +	F98411	210Qu	ut.

Figure 7. Server Resource Usage with the htop command



Figure 8. Email Notification Results

Discussion

No		Testing Instrument	Result	Desc
110		- osting more unione	A COUL	
1	The all to more the ne a.	bility of the SNMP Protocol nitor devices connected to twork, including: 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
2	b. The al	Access Point bility of the SNMP Protocol	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	Good
	device	es connected to the network		
	a. b.	Memory 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 91% remaining.	
			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.	

Table 1. Discussion	ı
---------------------	---

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

Conclusion

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

- 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.

References

- Abbasi, M., Shahraki, A., & Taherkordi, A. (2021). Deep learning for network traffic monitoring and analysis (NTMA): A survey. Computer Communications. https://www.sciencedirect.com/science/article/pii/S0140366421000426
- Ageyev, D., Radivilova, T., Mulesa, O., & ... (2022). Traffic monitoring and abnormality detection methods for decentralized distributed networks. ... Distributed Networks. https://doi.org/10.1007/978-3-030-95161-0_13
- Al-Ali, A., Barker, N. E., Egge, S., Dejong, C. A., & ... (2021). Medical monitoring device having multiple configurations. US Patent https://patents.google.com/patent/US10918281B2/en

- Barker, N. E., Dejong, C. A., Dotson, K. C., Al-Ali, A., & ... (2019). Modular multiparameter patient monitoring device. US Patent https://patents.google.com/patent/US10327713B2/en
- Choi, A., Noh, S., & Shin, H. (2020). Internet-based unobtrusive tele-monitoring system for sleep and respiration. IEEE Access. https://ieeexplore.ieee.org/abstract/document/9075220/
- Dwi Bayu Rendro. (2020). Analisis Monitoring Sistem Keamanan Jaringan Komputer Menggunakan Software NMAP (Studi Kasus Di SMK NEGERI 1 Kota Serang). Jurnal PROSISKO, Rekayasa Sistem Komputer, Fakultas Teknologi Informasi, Universitas Serang Raya.
- Fahlepi Roma Doni. (2018). Jaringan Komputer dengan Router Mikrotik. Simposium Nasional Ilmu Pengetahuan dan Teknologi (SIMNASIPTEK). Program Studi Teknik Informatika AMIK Bina Sarana Informatika Purwokerto.
- Hameed, B. H., Taher, A. Y., Ibrahim, R. K., Ali, A. H., & ... (2022). Based on mesh sensor network: design and implementation of security monitoring system with Bluetooth technology. Indonesian Journal of https://www.researchgate.net/profile/Adnan-Hussein-

Ali/publication/361089672_Based_on_mesh_sensor_network_design_and_impleme ntation_of_security_monitoring_system_with_Bluetooth_technology/links/62ad8ac 7e1193368baa5f061/Based-on-mesh-sensor-network-design-and-implementation-of-security-monitoring-system-with-Bluetooth-technology.pdf

- Jefri Nugraha. (2018). Analisa Dan Perancangan Sistem Informasi Erpustakaan. Jurnal SIMETRIS, Program Studi Sistem Informasi Universitas Muria Kudus.
- Kadhim, K. T., Alsahlany, A. M., Wadi, S. M., & ... (2020). An overview of patient's health status monitoring system based on internet of things (IoT). Wireless Personal https://doi.org/10.1007/s11277-020-07474-0
- Khasanov, D., Khujamatov, K., & ... (2021). WSN-BASED MONITORING SYSTEMS FOR

 THE SOLAR POWER STATIONS OF THE TELECOMMUNICATION DEVICES.

 IIUM
 Engineering

 http://ice.col/ic

https://journals.iium.edu.my/ejournal/index.php/iiumej/article/view/1464

- Lamego, M., Kiani, M. J. E., Lam, K., & Dalvi, C. (2022). Patient monitoring system. US Patent 11,272,852. https://patents.google.com/patent/US11272852B2/en
- Lu, Z., Nagpal, A., Yang, H. H., Shukla, H., & ... (2020). Computing system monitoring. US Patent https://patents.google.com/patent/US10733072B2/en
- Mahadevia, J. H., Dave, S. D., & Trivedi, B. H. (2020). Method and system for network access control based on traffic monitoring and vulnerability detection using process related information. US Patent 10,630,698. https://patents.google.com/patent/US10630698B2/en
- Micro, Andi. (2019). Dasar-dasar Jaringan Komputer. Madcom. Palembang.
- Peng, Y., & Wu, I. C. (2021). A cloud-based monitoring system for performance analysis in IoT industry. The Journal of Supercomputing. https://doi.org/10.1007/s11227-021-03640-8

- Philip, N. Y., Rodrigues, J., Wang, H., & ... (2021). Internet of Things for in-home health monitoring systems: Current advances, challenges and future directions. IEEE Journal on https://ieeexplore.ieee.org/abstract/document/9325147/
- Prasetyo. (2018). Teknik-teknik Pemantau Jaringan Skala Lokal. PT. Elek Media Coputindo. Jakarta.
- Sharma, D., Mazboudi, K. D., Devarajan, S., & ... (2021). Systems and methods for monitoring digital user experience. US Patent https://patents.google.com/patent/US10892964B2/en
- She, J. T. (2020). Design for communication network of internet in on-line monitoring system for power transmission and transformation equipment. IOP Conference Series: Materials Science and https://doi.org/10.1088/1757-899X/740/1/012157

Sukaridhoto, Sritrusta. (2019). Jaringan Komputer. Informatika. Bandung.

- Sukaridhoto, Sritrusta. (2019). Komunikasi Data & Komputer Dasar-Dasar Komunikasi Data. Informatika. Bandung.
- Yoder. (2017). Analisis dan desain, Sistem Informasi: Pendekatan terstruktur Teori dan Praktek Aplikasi Bisnis. Yogjakarta: Andi Offset.