Journal scientific and applied research, vol. 6, 2014
Association Scientific and Applied Research
International Journal

Original Contribution

ISSN 1314-6289

USING A SPECIALIZED SOFTWARE FOR COMPREHENSIVE MONITORING THE SUSPICIOUS STATES IN COMPUTER NETWORKS

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Abstract: *In this paper a comprehensive scanning and monitoring the suspicious states in determined computer networks is made. Most of the computer and network problems with many vulnerabilities are connected. Therefore it is advisable to scan the entire computer network in order to detect weaknesses and accordingly be taken precautions Thanks to the many malicious users will not be able to penetrate in the relevant computer network and to gain access to computer resources.*

Key words: *Computer and network security, cyber-attacks, Monitoring, Penetration, Scanning, Sensors, Vulnerabilities, Windows 7.*

1. Introduction

Each computer network must be repeatedly scanned and monitored with specialized application software products. Many of the cyber-criminals and malicious users use the vulnerabilities in these computer network systems in order to gain an unauthorized access and therefore to compromise confidential user information. This paper is structured as follows. First, in section 2, different measurement techniques of network scanning and monitoring are made. After that, in section 3, class C network (192.168.0.0/24) for vulnerabilities, errors and problems 24) is scanned and monitored. The achieved results are presented in section 4. The final conclusions and recommendations are made in section 5.

2. Related work

In [2] a HTTP traffic measurements on determined networks by Vladimir Deart, Vladimir Mankov and Alexander Pilugin, is made. In [5] autonomous malicious activity inspector - AMAI by [5] Umar Manzoor, Samia Nefti and

Yacine Rezgui is presented and used. In [7] the software PRTG Network Monitor by Paessler, A. G. is explained. In [10] network traffic monitoring and analysis tools by Chakchai SO-IN are presented and classified. In [12] network monitoring based on flow measurement techniques by Michiel Uithol is performed.

3. Experiment

The experiment in specialized university computer lab is made. The network ID of this LAN is 192.168.0.0/24. The used software is PRTG network monitor freeware version. Initially was necessary to configure the software product. The SSL encryption connection has been made. After that credentials for SNMP (Simple Network Management Protocol) [12] based network devices was chosen. Most of the network devices like switches, routers, multilayer switches and firewalls support this protocol for scanning and monitoring the determined network. The version v2c and SNMP [9],[10],[11] port 161 were selected. The DNS server addresses were also entered. A network class C (192.168.0.0/24) was configured. The IP address range has been started from 1 and ended at 254. The following experiments only with education intend and purposes are made. The Microsoft Windows 7 Enterprise SP1 operating system in the scanning host has been used. On fig. 1 the overview of the discovered network is shown.

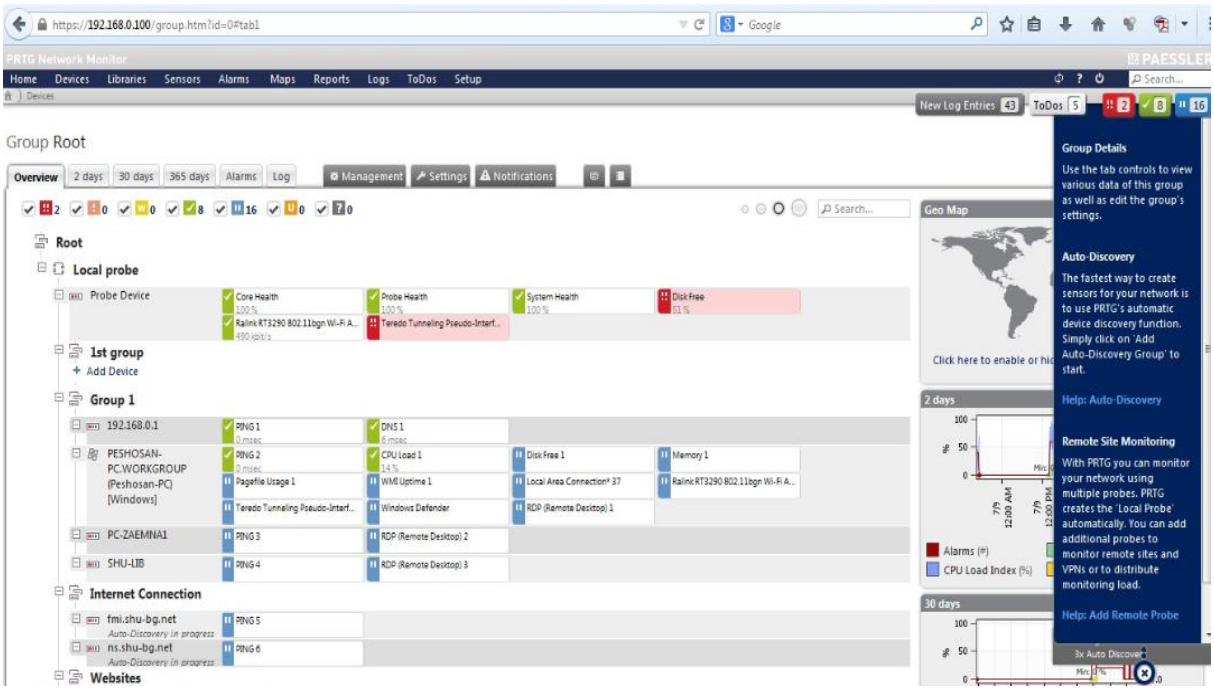


Fig. 1. An overview of the discovered network

The figure has shown that there are several subgroup of the root mainframe.

The Local probe group has showed that there are two important alarm notifications. The first sensor was Disk free and his status was in down state. The message was "7% (Free Space D:) is below the error limit of 10%. The second sensor message was Teredo Tunneling Pseudo-Inferface and his status was also in down state [2],[5],[10]. The warning message was "Could not log in using the specified credentials. Please make sure they are not only valid for the target system, but for the probe system as well. (Performance Counter error 0xB0000004).

The group 1 show has presented several important results as well.

The ping and DNS probe for host with IP address 192.168.0.1 were successfully made. The host PESHOSAN-PC.WORKGROUP (Peshosan-PC) had 2 successfully sensors for PING 2 and CPU Load 1, but at the same time had several sensors with warning states. These sensors were:

- Disk Free 1;
- Memory 1;
- Pagefile Usage 1;
- WMI Uptime 1;
- Local Area Connection* 37 [2], [4];
- Windows Defender;
- RDP (Remote Desktop) 1 and etc.

The other discovered hosts were PC-ZAEMNA1 and SHU-LIB.
The Internet connection group has shown only two sub-domain addresses - fmi.shu-bg.net and ns.shu-bg.net.

4. Results.

Thanks to the achieved scan and monitor of the selected local area network there has been found some flaws, errors and vulnerabilities. It is recommended and important the appropriate configurations be made. On fig.2 several sensor graphs are shown.

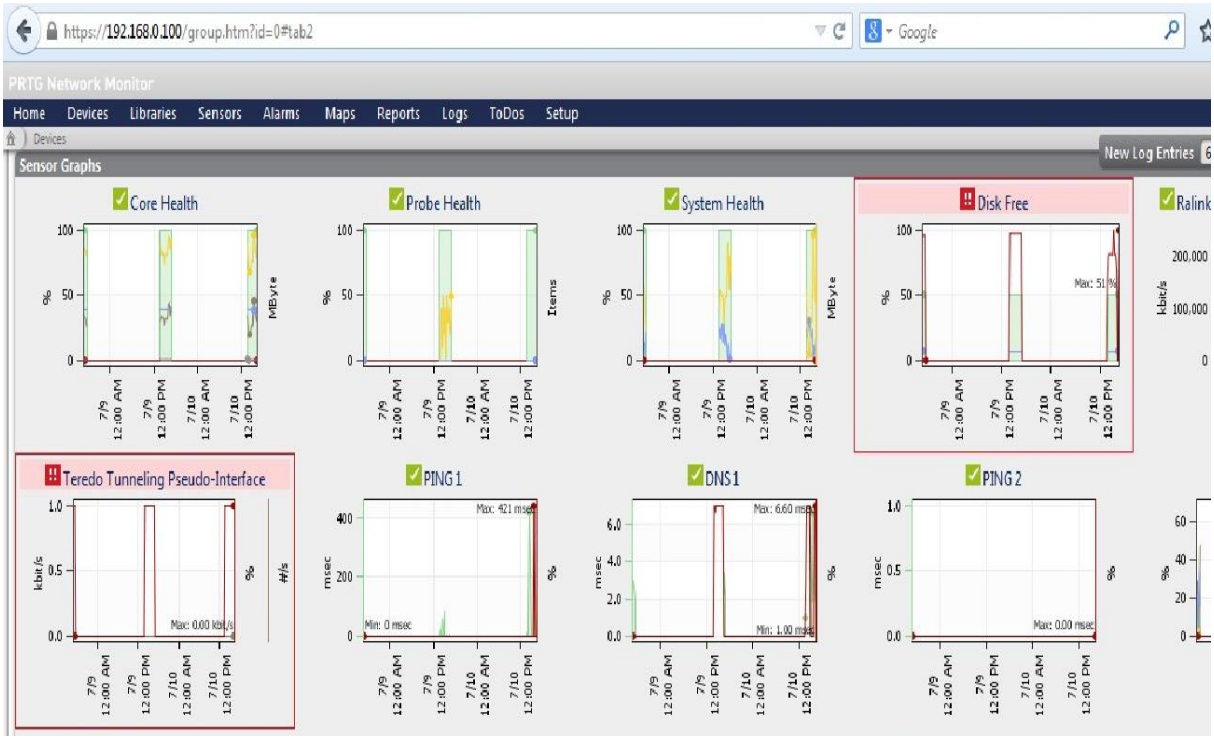
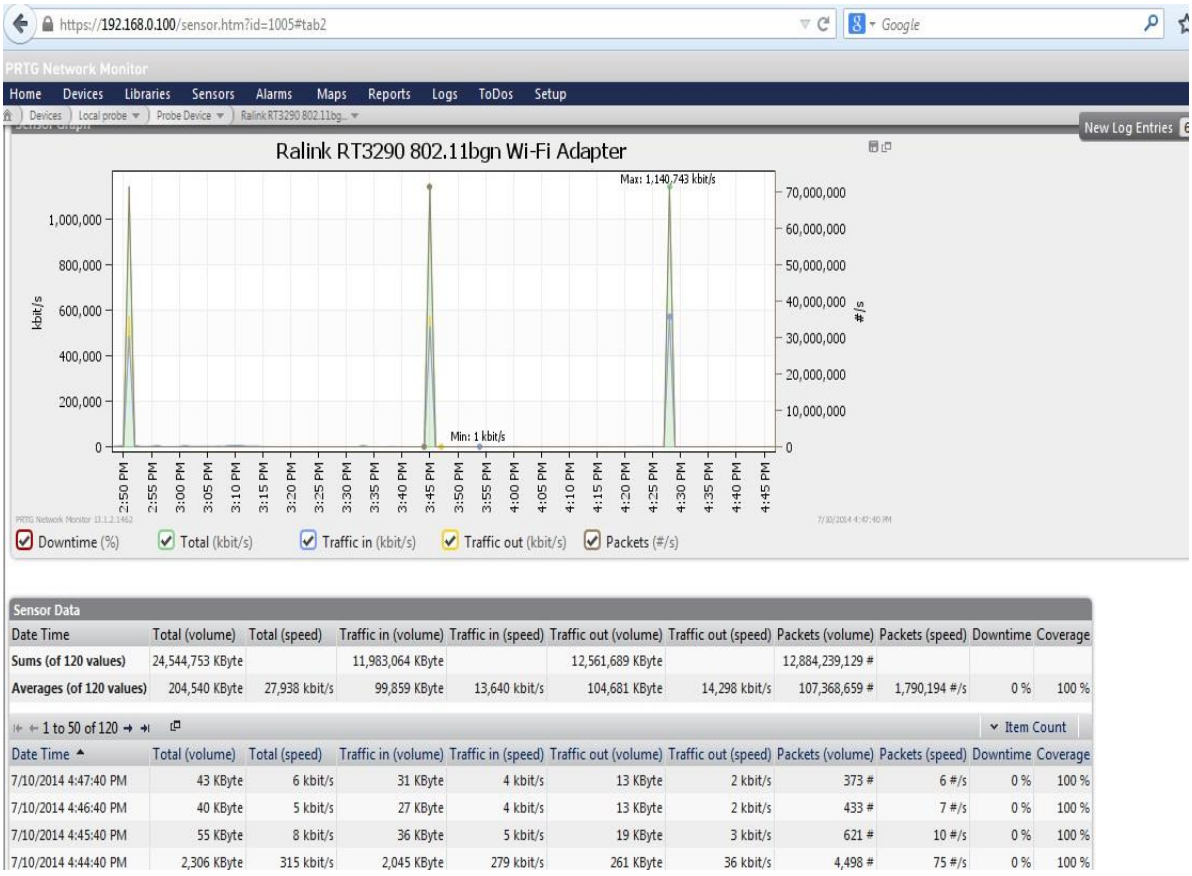


Fig. 2. Several sensor graphs

On fig. 3 the behavior of the probe device - Ralink RT3290 802.11bgn Wi-Fi Adapter is shown.



Sensor Data

Date Time	Total (volume)	Total (speed)	Traffic in (volume)	Traffic in (speed)	Traffic out (volume)	Traffic out (speed)	Packets (volume)	Packets (speed)	Downtime	Coverage
Sums (of 120 values)	24,544,753 KByte		11,983,064 KByte		12,561,689 KByte		12,884,239,129 #			
Averages (of 120 values)	204,540 KByte	27,938 kbit/s	99,859 KByte	13,640 kbit/s	104,681 KByte	14,298 kbit/s	107,368,659 #	1,790,194 #/s	0 %	100 %

1 to 50 of 120 — Item Count

Date Time	Total (volume)	Total (speed)	Traffic in (volume)	Traffic in (speed)	Traffic out (volume)	Traffic out (speed)	Packets (volume)	Packets (speed)	Downtime	Coverage
7/10/2014 4:47:40 PM	43 KByte	6 kbit/s	31 KByte	4 kbit/s	13 KByte	2 kbit/s	373 #	6 #/s	0 %	100 %
7/10/2014 4:46:40 PM	40 KByte	5 kbit/s	27 KByte	4 kbit/s	13 KByte	2 kbit/s	433 #	7 #/s	0 %	100 %
7/10/2014 4:45:40 PM	55 KByte	8 kbit/s	36 KByte	5 kbit/s	19 KByte	3 kbit/s	621 #	10 #/s	0 %	100 %
7/10/2014 4:44:40 PM	2,306 KByte	315 kbit/s	2,045 KByte	279 kbit/s	261 KByte	36 kbit/s	4,498 #	75 #/s	0 %	100 %

Fig. 3. The behavior of the probe device - Ralink RT3290 802.11bgn Wi-Fi Adapter

This graph had the following important items:

- Date Time;
- Total (volume);
- Total (speed);
- Traffic in (volume) [3], [6], [8];
- Traffic in (speed);
- Traffic out (volume);
- Traffic out (speed);
- Packets (volume);
- Packets (speed) [9], [11];
- Downtime;
- Coverage and etc.

On fig. 4 the whole network segment like a doughnut is shown.

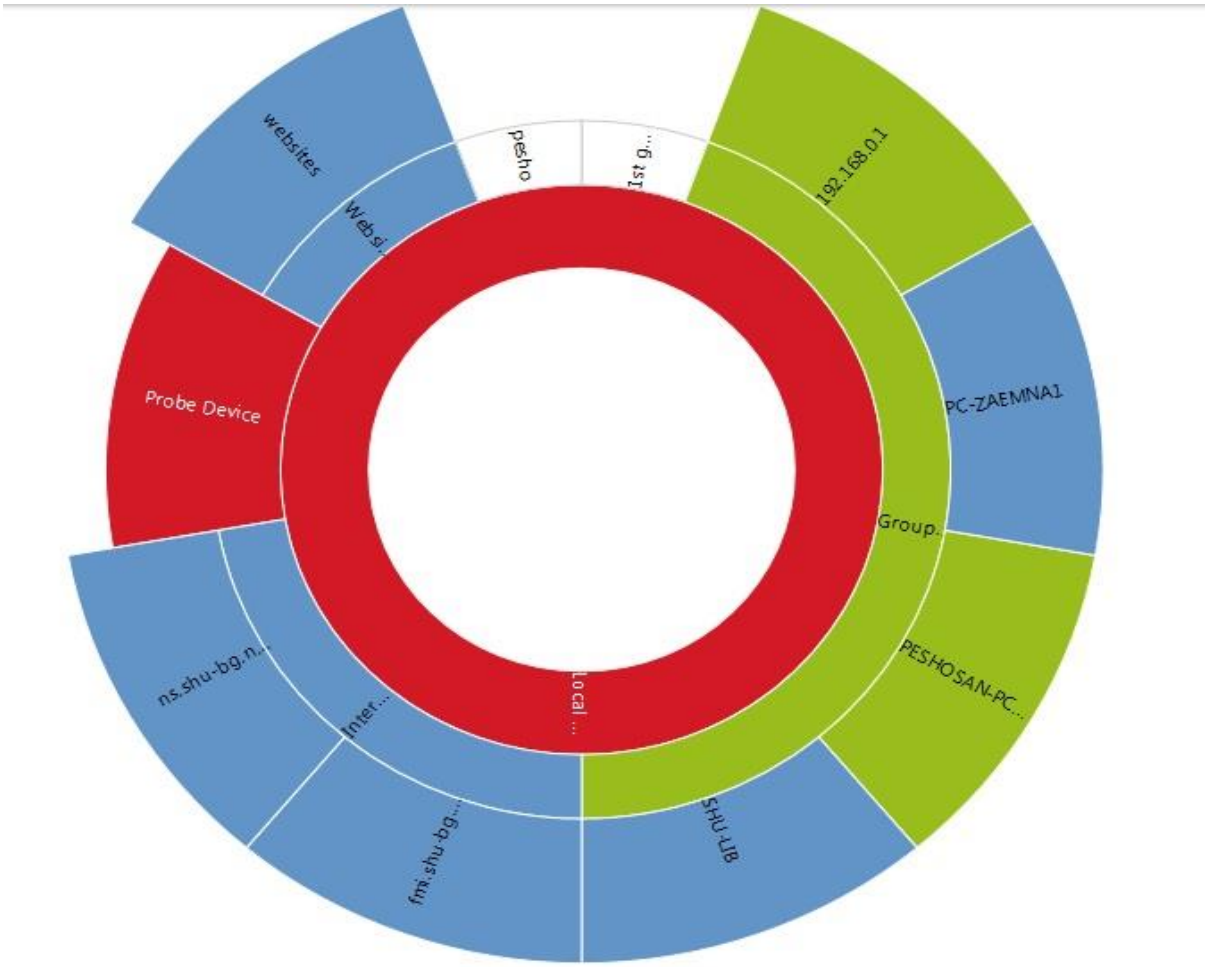


Fig. 4. The whole network segment

In the core of this doughnut it could be seen that the local probe is in red color and means that the system administrator or security-professionals must take measures to fix the following problems and therefore to reduce the weaknesses in the selected computer network.

5. Conclusion

In this paper a comprehensive scanning and monitoring the suspicious states in determined computer networks is made. Thanks to the achieved results for the selected network 192.168.0.0/24 the system administrator and IT specialists must take actions and to fix the problems and to figure out specialized plans that will protect the entire computer network system from various malicious cyber-attacks. The daily scanning and testing for weaknesses is the best solution for the correct and stable operation of the system.

Acknowledgements

This paper is supported by the Project BG051PO00l-3.3.06-0003 "Building and steady development of PhD students, post-PhD and young scientists in the areas of the natural, technical and mathematical sciences". The Project is realized by the financial support of the Operative Program "Development of the human resources" of the European social found of the European Union.

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