A Proposed Intrusion Detection System

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ABSTRACT

This paper titled "**Proposed Intrusion Detection System"** is an intrusion detection system (IDS) proposed by analyzing the principle of the intrusion detection system based on host and network. Here we are concentrating and analyzing overall performance as well as security of the proposed IDS. Moreover the proposed IDS approve the effectiveness of the proposed method, and presented results shows advantages of host based as well as network based security. The proposed model of hybrid IDSs offers several advantages over alternative systems. First of all it provided higher security, it supported high availability and scalability, and most important thing it produced good results in terms of normal and abnormal behaviors of captured packet. The proposed model includes integration of individual components to produced batter results.

GENERAL TERMS

Intrusion,Intrusion Detection

Keywords:

IDS, Protocols, Network, Security, TCP, Attacks

1. INTRODUCTION

Nowadays the number of computer networks keeps growing in parallel with transactions, especially on the Internet while streaming, video conferencing, chatting, searching, etc. These various types of transactions introduce many intrusions and anomalies into the network. Network traffic is often seen to display sudden deviations from normal behaviour. Some of these aberrations are caused by malicious network attacks such as Denial-Of-Service or viruses, whereas others are the result of equipment failures and accidental outages [10]. Many methods have been developed by organizations and play very important roles to secure network infrastructure and communications via the Internet such as through the use of firewalls, anti-virus software packages and intrusion detection systems. Current firewalls cannot defend against every category of intrusion, whereby some intrusions take advantages of computer system vulnerabilities [11]. An intrusion detection system (IDS) provides around-the-clock network observation and is an additional wall to secure the network. The intrusion detection system is a process of determining an intrusion into a system through the observation of available information concerning the state of the system, monitoring user activities and reporting to a management station. Intrusion detection refers to the detection of cruel activity (break-ins, penetrations, and other forms of computer abuse) in a computer-related system [12]. Therefore, the ID techniques are classified into host-based and network-based depending on the type and source of information used to identify security breaches [13, 14] depending on the method of intrusion detection. One definition from the study that an intrusion is any activity that moves a system from a safe state to an unsafe state, but this does little to clarify the situation. Another definition declares, in essence, that an intrusion is anything that violates the policy of the site under consideration, but this also does little to address the issues at hand.Here defining each word of intrusion detection (ID)

Intrusion: The act of wrongfully entering upon, seizing, or taking possession of the property of another.

Detection: The act of discovering or determining the existence, presence, or fact of.

Intrusion Detection: The act of discovering or determining the existence, presence, or fact of the wrongfully entering upon, seizing, or taking possession of the property of another.

The concept of security and the word intrusion detection system might be intimidating and complicated. The objective of the paper is to develop a tool that mediates the user and the operations to achieve security goals. A platform independent tool with user-friendly graphical user interface, using already existing techniques and concept for intrusion detection system will be resulting product. People need to use the intrusion detection system in order to identified attacks in host based system and network based system. The operations include bunch of rules to identify the attacks of foreigners to reach and read personal files that is located in personal computer or the owner would like to send somewhere. Computers connected directly to the Internet are subject to relentless probing and attack. While protective measures such as safe configuration, up-to-date patching, and firewalls are all prudent steps they are difficult to maintain and cannot guarantee that all vulnerabilities are shielded. IDS provides defense in depth by detecting and logging hostile activities. An IDS system acts as "eyes" that watch for intrusions when other protective measures fail. The primary objective of the proposed work is to propose a new "**Proposed Intrusion Detection System**" (PIDS) concept which is including both type (host and network) functionality, without explaining the fixed intrusion detection system used in that concept. The proposed PIDS affects the performance of execution and security analysis. Each issue will be investigating in detail in the proposed work. The proposed concept does rely on specific PIDS.

Rest of the paper is organized are as follow: Section II presents proposed work where we have discussed proposed work in the field of IDS. Section III is presets results analysis and finally section IV present conclusion.

2. PROPOSED WORK

This intrusion detection system monitors individual systems upon the network. In this case, the sensor of the IDS is located inside of the particular host to monitor system-level behavior. This type of intrusion detection is especially useful for monitoring potentially dangerous user activity within the network. It's clear that there are two types of host-based intrusion detection software: host wrappers (or personal firewalls) and agent-based software. Here describes the host wrappers as tools that can be configured to look at all network packets, connection attempts, or login attempts to the monitored machine. The agent-based software has the same abilities as the host wrappers, but can also detect changes in system files and changes in user privileges. A report by Network Associates makes a good argument for host-based intrusion detection, stating, and any masking techniques such as insertion, padding, fragmentation, or out-of-sequence delivery, which would evade a network-based IDS can be easily caught by a host-based IDS." Additionally, host-based IDSs can be quite effective in switched environments, whereas network-based IDS systems are less effective in that environment. A switch tends to isolate communications on the network, making it difficult for network-based IDS to monitor all traffic. However, if the systems on the switched network have host-based IDSs installed, potential attacks may be thwarted.

3. System Architecture

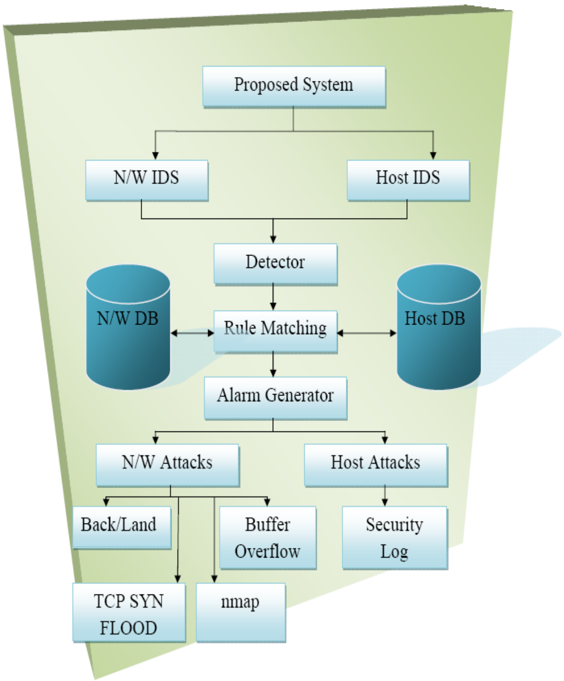


Figure 1 is showing the proposed system architecture which is the combination of host based and network based intrusion detection system, due to this it's known as "Hybrid Intrusion Detection System (HIDS)". In this figure particular IDS capture packets and call to detector agent where detector agent pass capture packets to rule matching process where rule matching process check attacks criteria from the database , where we have already defend and stored rule to find attack. After completing this process alarm will activate if any type of attack find in the captured packet otherwise it will be deactivate and this processes will continue till on the proposed system. Figure 1: Architecture of the proposed system

In the Proposed HIDS system is the both type of attack detection is used. At the time of TCP packets header extracting proposed system checks the arriving IP header. From IP header it selects only TCP protocol. Figure 2 is showing block diagram of proposed "**Network Intrusion Detection System (NIDS)"** there are two mode of the proposed IDS one is Network based and another is Host based In mode 1 we are finding four type of attack or abnormality in the captured pactes which is follows: "TCP SYN FLOOD Attack" "Back/Land", Buffer Over Flow", "Abnormal Packets" and "NMAP"). In Mode 2, we are finding one type of attack by analyzing the security event log file which is stored in local system. From security event log file we have finding two types of attacks which is follows: "Un-authorize accessing" and Login failed".

Figure 2 is showing the block diagram of the proposed Network Based Intrusion Detection System. In this proposed NIDS

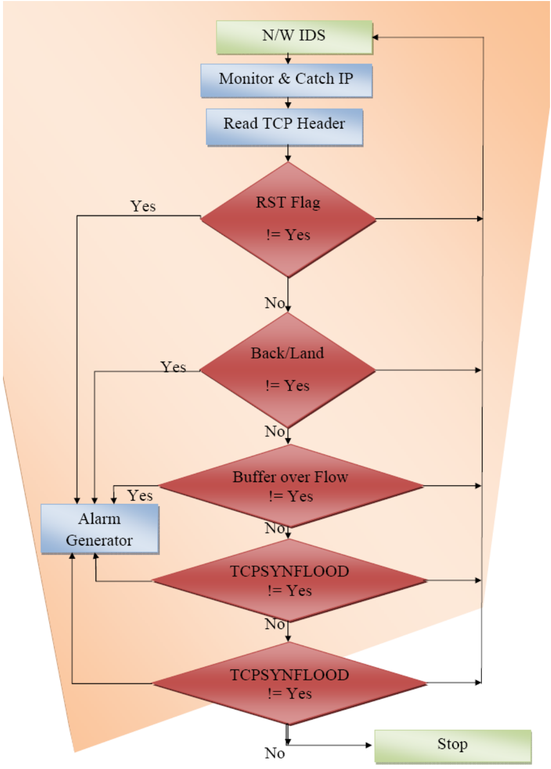
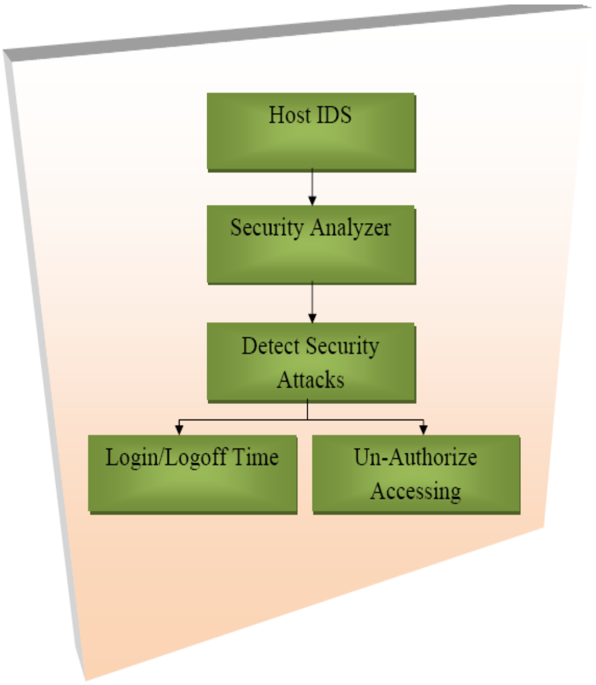


Figure 2: Block Diagram of Proposed NIDS

find four different conditions for attacks first it monitor and catch packets which is traveling over public network like internet, after catching packets, TCP header is extracted and analyzed its attribute. If RST flag find in its attribute then it will treat as an abnormal packet and will go to the alarm generator to note that this is infected packets and it should be treat as an attack type. Another condition is for Back/land type attack this type attack is belongs to DOS attack category. Basically "Back" attack find on application layers and "Land" attack find on transport layers. The condition for this type of attack is to analyze number of packet which is arriving from same host with in a time. In this we have set time limit to capture such type of packets and the time limit is 3 second time and 15 packets. If the same host are sending 15 or more then 15 packets in 3 second then that host is the intruder which is generating reported fake address then it will also treat as an attack type. Another condition of attack is the buffer overflow which is belongs to UTR attack is unauthorized access from a remote machine. For this attack we have set window buffer size and check overflow condition if overflow is occurring by the capture packets that mean such type of attack can be activate another definition of this attack capturing packet are lager then the predefined window buffer size then that packet will treat as an attack type. At last we have check TCPSYNFLOOD attack condition in this we check the threshold value of the arriving packets if the threshold value of the arriving packet are less then predefined threshold value then the packet is normal otherwise packet as infected packets and it will treat as an attacks type.

Figure 3 is showing the block diagram proposed "**Host Based Intrusion Detections System (HIDS)**". In this system we have concentrating only for security log file where security log analyzer will detect attack which is related with system security. As we know that in this log file there are so many values to analyze security of the system but we have concentrate only two value which is already define above. Proposed HIDS call security analyzer to check or find attack in local host then it will detect security attack in security event log file. After completing this it will produce results. If any illegal activity find in this log file like un-authorize accessing or login failed then it will go to alarm system for information that this system is suffering from attack.

This paper focused on both (N/W & Host) type of attack. To detect various type of N/W attacks we have set some parameter like window buffer size for UTR, 5 IP address from same source in 1 second that means fake address for DOS, TCP header flag are set RST then abnormal and to detect SYN attack we are using the threshold time interval value of Δ T which will be vary from small to large. So we set *Δ* T =15 sec, 25 sec and 35 sec and T=1000 millisecond by default. Default value will be use in the absence of actual threshold value. In the host based IDS we have set password to the tested system and defined working time. And we are login with wrong user name and password and also login in wrong time period to capture host based attack.

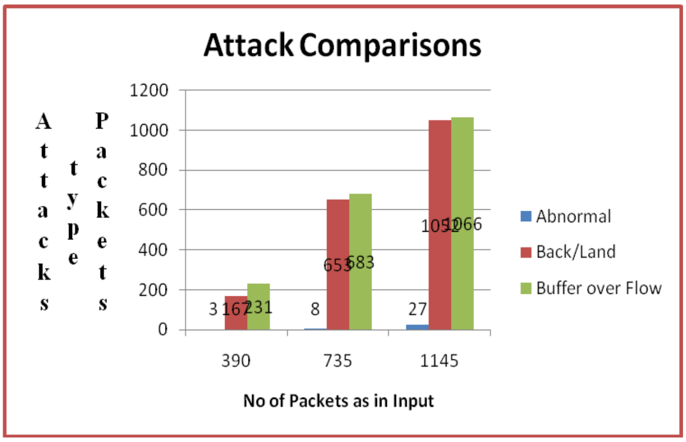


For experiment, proposed system used desktop machine. Configuration of that machine is Intel Pentium Dual Core E2200 2.20 Ghz, 1 GB of RAM and Window-XP SP2, where performance data is collected. Table 1 is showing various type of attack which is capturing by the proposed N/W IDS where table 2 is showing TCP SYN Flood and table 3 is showing security log attack in Host IDS. Proposed system n run number of time and results are shown in tables 1, 2 and 3.

4. FIGURE

Table 1: Attacks Comparisons in N/W IDS

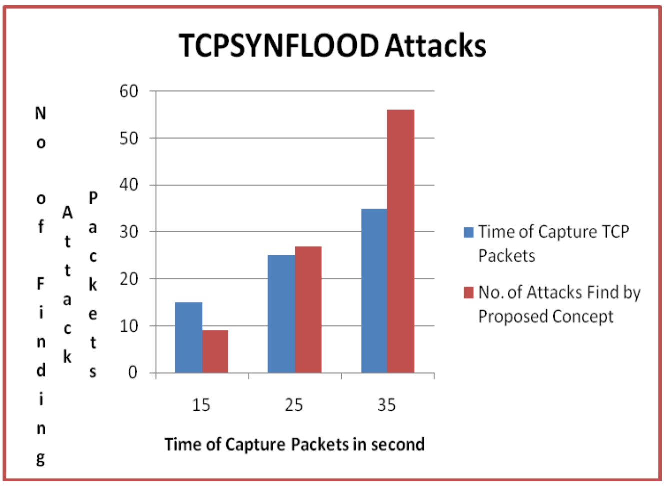
No. of Packets	Abnormal	Back/Land	Buffer over Flow
Presented Results for Attack are in approx			
390	3	167	231
735	8	653	683
1145	27	1052	1066



Graph 1: Various Attack analysis

S. No.	Time of Capture TCP Packets	No. of Attacks Find by Proposed Concept
Presented Results for Attack are in approx		
1	15 Sec	9
2	25 Sec	27
3	35 Sec	56

Table 2: TCP SYN Flood Attacks



Graph 2: TCPSYNFLOOD Attack

Total Events	Un-Authorize Access	Login Failed
Presented Results for Attack are in approx		
250	56	8
210	44	5
165	34	9
130	24	4
80	16	3
60	11	3
40	9	2

Table 3: Attacks Comparisons in Host IDS

5. Conclusion

In this paper, we proposed a hybrid IDS system to detect various types of attacks like TCP SYN Flood, Back/Land, and Buffer over Flow and Abnormal packets in N/W IDS and for Host IDS UN-authorize accessing and login/logout failed. The proposed system is providing both type of functionality in one system which is improving overall efficiency of the existing IDS. In future we will we work on layers protocol and try to find attack on layers wise that mean in which layers what type of attack will perform and how we can protect from or prevent them.

6. Acknowledgement

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