

Detecting SQL Injection Attacks Using SNORT IDS

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Abstract—SQL injection attack poses a serious security threats among the Internet community nowadays and it's continue to increase exploiting flaws found in the Web applications. In SQL injection attack, the attackers can take advantage of poorly coded web application software to introduce malicious code into the system and/or could retrieve important information. Web applications are under siege from cyber criminals seeking to steal confidential information and disable or damage the services offered by these application. Therefore, additional steps must be taken to ensure data security and integrity of the applications. In this paper we propose an innovative solution to filter the SQL injection attack using SNORT IDS. The proposed detection technique uses SNORT tool by augmenting a number of additional SNORT rules. We evaluate the proposed solution by comparing our method with several existing techniques. Experimental results demonstrate that the proposed method outperforms other similar techniques using the same data set.

Keywords—SQL Injection, SNORT, Intrusion detection, topology.

I. INTRODUCTION

The Internet has rapidly become an integral part of everyday life and our reliance on it is expected to continue to grow. However, its rapid adoption has also left it susceptible to misuse and/or abuse. Along with the growth of the Internet, there has been a dramatic growth in SQL Injection Attack (SQLIA) [1]. It is a major concern that despite the increasing development of IDS (Intrusion detection system) and anti-malware services and technologies, the volume of SQLIA continues to grow day by day [1]. Therefore, effective and efficient detection techniques are of critical importance to the computer user community. Over the last decade, researchers have adopted a diversity of solutions in order to control the SQLIA [1, 2, 3, 13, 14, 15, 6 & 16]. SQLIA is one of the most devastating techniques for stealing data from backend. It also has been argued that SQLIA comes under the top ten security threats in web applications [6]. Using this kind of attack an attacker can get access to the database and steal classified information. The concept of IDS was initially appeared in James Anderson's technical report [2] in 1980. This first generation IDS could monitor, audit, and log an attacked machine. The main task was to search the audit logs for predefined patterns of a suspicious activity [2]. Most IDSs are reliable in detecting suspicious actions by evaluating TCP/IP connections or log files, when the IDS finds a suspicious

action, it creates an alert which contains information about the source, target, and preview type of the attack SNORT is one of the effective and a popular rule based Network Intrusion Detection System (NIDS) tools to identify intrusion attacks [3]. It is an open-source software developed by Martin Roesch [3], and it uses regular expression-based rules for intrusion detection. SNORT is a packet sniffer that monitors network traffic in real time and supports protocols including TCP, UDP, IP and ICMP [3]. It verifies each packet closely to detect a unsafe payload or suspicious anomalies. When a suspicious behavior is identified, SNORT immediately generates a real-time alert by logging it to the alert file, and/or activating a popup window. SQL Injection and XSS (Cross-site scripting) are the most common and serious web application vulnerabilities threatening the privacy and security of both clients and applications nowadays [6]. It causes serious threats among the Internet user community due to its recent dynamic attack patterns [10]. The current IDS are not sufficient to prevent or generate real-time security alerts to the users [8]. It has been investigated how SQL injection attacks are conducted and how hackers use SQL injection to attack web applications [9]. To mitigate this problem, developers have proposed a range of coding guidelines that promote defensive coding practices, such as encoding user input and validation [6]. Researchers also proposed many vulnerability detection approaches such as static taint analysis [4] and concolic testing [5], however, these techniques suffer from high FP (false positive) instances.

Conversely, there are many types of SQLIAs and its numerous variations of its basic types. However, researchers are often unaware about its variations, and most of their proposed solutions detect or prevent only a subset of the possible SQLIAs. Therefore, it has become a challenge for the research community to develop an active defense technique against the SQL Injection and XSS attack. Keeping this in mind, we have investigated several alternatives for SNORT rules and evaluate its performances. Based on our investigations, we propose a set of rules for SNORT tool. Our empirical performance shows that our technique outperforms with similar existing techniques using similar data set.

The main contributions of this paper are three folds:

- A. Analyses the SNOT IDS and propose five different snort rules.

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