

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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S Ashworth



Detecting Sql Injection Attacks Using Snort Ids:

Algorithms in Advanced Artificial Intelligence R. N. V. Jagan Mohan, Vasamsetty Chandra Sekhar, V. M. N. S. S. V. K. R. Gupta, 2024-07-08 The most common form of severe dementia Alzheimer's disease AD is a cumulative neurological disorder because of the degradation and death of nerve cells in the brain tissue intelligence steadily declines and most of its activities are compromised in AD Before diving into the level of AD diagnosis it is essential to highlight the fundamental differences between conventional machine learning ML and deep learning DL This work covers a number of photo preprocessing approaches that aid in learning because image processing is essential for the diagnosis of AD The most crucial kind of neural network for computer vision used in medical image processing is called a Convolutional Neural Network CNN The proposed study will consider facial characteristics including expressions and eye movements using the diffusion model as part of CNN's meticulous approach to Alzheimer's diagnosis Convolutional neural networks were used in an effort to sense Alzheimer's disease in its early stages using a big collection of pictures of facial expressions *International Conference on Applications and Techniques in Cyber Security and Intelligence* Jemal Abawajy, Kim-Kwang Raymond Choo, Rafiqul Islam, 2017-10-20 This book presents the outcomes of the 2017 International Conference on Applications and Techniques in Cyber Security and Intelligence which focused on all aspects of techniques and applications in cyber and electronic security and intelligence research The conference provides a forum for presenting and discussing innovative ideas cutting edge research findings and novel techniques methods and applications on all aspects of cyber and electronic security and intelligence *Handbook of Research on Pattern Engineering System Development for Big Data Analytics* Tiwari, Vivek, Thakur, Ramjeevan Singh, Tiwari, Basant, Gupta, Shailendra, 2018-04-20 Due to the growing use of web applications and communication devices the use of data has increased throughout various industries It is necessary to develop new techniques for managing data in order to ensure adequate usage The Handbook of Research on Pattern Engineering System Development for Big Data Analytics is a critical scholarly resource that examines the incorporation of pattern management in business technologies as well as decision making and prediction process through the use of data management and analysis Featuring coverage on a broad range of topics such as business intelligence feature extraction and data collection this publication is geared towards professionals academicians practitioners and researchers seeking current research on the development of pattern management systems for business applications **Online Banking Security Measures and Data Protection** Aljawarneh, Shadi A., 2016-09-23 Technological innovations in the banking sector have provided numerous benefits to customers and banks alike however the use of e banking increases vulnerability to system attacks and threats making effective security measures more vital than ever Online Banking Security Measures and Data Protection is an authoritative reference source for the latest scholarly material on the challenges presented by the implementation of e banking in contemporary financial systems Presenting emerging techniques to secure these systems against potential threats

and highlighting theoretical foundations and real world case studies this book is ideally designed for professionals practitioners upper level students and technology developers interested in the latest developments in e banking security

Snort Intrusion Detection and Prevention Toolkit Brian Caswell, Jay Beale, Andrew Baker, 2007-04-11 This all new book covering the brand new Snort version 2.6 from members of the Snort developers team This fully integrated book and Web toolkit covers everything from packet inspection to optimizing Snort for speed to using the most advanced features of Snort to defend even the largest and most congested enterprise networks Leading Snort experts Brian Caswell Andrew Baker and Jay Beale analyze traffic from real attacks to demonstrate the best practices for implementing the most powerful Snort features The book will begin with a discussion of packet inspection and the progression from intrusion detection to intrusion prevention The authors provide examples of packet inspection methods including protocol standards compliance protocol anomaly detection application control and signature matching In addition application level vulnerabilities including Binary Code in HTTP headers HTTP HTTPS Tunneling URL Directory Traversal Cross Site Scripting and SQL Injection will also be analyzed Next a brief chapter on installing and configuring Snort will highlight various methods for fine tuning your installation to optimize Snort performance including hardware OS selection finding and eliminating bottlenecks and benchmarking and testing your deployment A special chapter also details how to use Barnyard to improve the overall performance of Snort Next best practices will be presented allowing readers to enhance the performance of Snort for even the largest and most complex networks The next chapter reveals the inner workings of Snort by analyzing the source code The next several chapters will detail how to write modify and fine tune basic to advanced rules and pre processors Detailed analysis of real packet captures will be provided both in the book and the companion material Several examples for optimizing output plugins will then be discussed including a comparison of MySQL and PostgreSQL Best practices for monitoring Snort sensors and analyzing intrusion data follow with examples of real world attacks using ACID BASE SGUIL SnortSnarf Snort_stat.pl Swatch and more The last part of the book contains several chapters on active response intrusion prevention and using Snort's most advanced capabilities for everything from forensics and incident handling to building and analyzing honey pots This fully integrated book and Web toolkit covers everything all in one convenient package It is authored by members of the Snort team and it is packed full of their experience and expertise Includes full coverage of the brand new Snort version 2.6 packed full of all the latest information

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Hackers Challenge : Test Your Incident Response Skills

Using 20 Scenarios Mike Schiffman,2001 Malicious hackers are everywhere these days so how do you keep them out of your networks This unique volume challenges your forensics and incident response skills with 20 real world hacks presented by upper echelon security experts Important topics are covered including Denial of Service wireless technologies Web attacks and malicious code Each challenge includes a detailed explanation of the incident how the break in was detected evidence and possible clues technical background such as log files and network maps and a series of questions for you to solve Then in Part II you get a detailed analysis of how the experts solved each incident *Library & Information Science Abstracts* ,2008

Anti-Hacker Tool Kit, Fourth Edition

Mike Shema,2014-02-07 Featuring complete details on an unparalleled number of hacking exploits this bestselling computer security book is fully updated to cover the latest attack types and how to proactively defend against them Anti Hacker Toolkit Fourth Edition is an essential aspect of any security professional s anti hacking arsenal It helps you to successfully troubleshoot the newest toughest hacks yet seen The book is grounded in real world methodologies technical rigor and reflects the author s in the trenches experience in making computer technology usage and deployments safer and more secure for both businesses and consumers The new edition covers all new attacks and countermeasures for advanced persistent threats APTs infrastructure hacks industrial automation and embedded devices wireless security the new SCADA protocol hacks malware web app security social engineering forensics tools and more You ll learn how to prepare a comprehensive defense prior to attack against the most invisible of attack types from the tools explained in this resource all demonstrated by real life case examples which have been updated for this new edition The book is organized by attack type to allow you to quickly find what you need analyze a tool s functionality installation procedure and configuration supported by screen shots and code samples to foster crystal clear understanding Covers a very broad variety of attack types Written by a highly sought after security consultant who works with Qualys security Brand new chapters and content on advanced persistent threats embedded technologies and SCADA protocols as well as updates to war dialers backdoors social engineering social media portals and more *Intrusion Detection & Prevention* Carl Endorf,Eugene Schultz,Jim Mellander,2004 This volume covers the most popular intrusion

detection tools including Internet Security Systems Black ICE and RealSecurity Cisco Systems Secure IDS and Enterscept Computer Associates eTrust and the open source tool Snort

CEH Certified Ethical Hacker Practice Exams, Second Edition Matt Walker,2014-08-05 Don't Let the Real Test Be Your First Test Fully updated for the CEH v8 exam objectives this practical guide contains more than 650 realistic practice exam questions to prepare you for the EC Council's Certified Ethical Hacker exam To aid in your understanding of the material in depth explanations of both the correct and incorrect answers are provided for every question A valuable pre assessment test evaluates your readiness and identifies areas requiring further study Designed to help you pass the exam this is the perfect companion to CEH Certified Ethical Hacker All in One Exam Guide Second Edition Covers all exam topics including Introduction to ethical hacking Reconnaissance and footprinting Scanning and enumeration Sniffing and evasion Attacking a system Hacking web servers and applications Wireless network hacking Trojans and other attacks Cryptography Social engineering and physical security Penetration testing Electronic content includes Test engine that provides full length practice exams and customized quizzes by chapter

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Hardening Network Security John Mallery,2005 Provides insights on maintaining security of computer networks covering such topics as identity management systems Web services mobile devices data encryption and security patching

Principles of Computer Security, Fourth Edition Wm. Arthur Conklin,Greg White,Chuck Cothren,Roger L. Davis,Dwayne Williams,2016-01-01 Written by leading information security educators this fully revised full color computer security textbook covers CompTIA's fastest growing credential CompTIA Security Principles of Computer Security Fourth Edition is a student tested introductory computer security textbook that provides comprehensive coverage of computer and network security fundamentals in an engaging and dynamic full color design In addition to teaching key computer security concepts the textbook also fully prepares you for CompTIA Security exam SY0 401 with 100% coverage of all exam objectives Each chapter begins with a list of topics to be covered and features sidebar exam and tech tips a chapter summary and an end of chapter assessment section that includes key term multiple choice and essay quizzes as well as lab projects Electronic

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CompTIA CySA+ Cybersecurity Analyst Certification All-in-One Exam Guide, Third Edition (Exam CS0-003)
Mya Heath, Bobby E. Rogers, Brent Chapman, Fernando Maymi, 2023-12-08 Prepare for the CompTIA CySA certification exam using this fully updated self study resource Take the current version of the challenging CompTIA CySA TM certification exam with confidence using the detailed information contained in this up to date integrated study system Based on proven pedagogy the book contains detailed explanations real world examples step by step exercises and exam focused special elements that teach and reinforce practical skills CompTIA CySA TM Cybersecurity Analyst Certification All in One Exam Guide Third Edition Exam CS0 003 covers 100% of 2023 exam objectives and features re structured content and new topics Online content enables you to test yourself with full length timed practice exams or create customized quizzes by chapter or exam domain Designed to help you pass the exam with ease this comprehensive guide also serves as an essential on the job reference Includes access to the TotalTester Online test engine with 170 multiple choice practice exam questions and additional performance based questions Includes a 10% off exam voucher coupon a 39 value Written by a team of recognized cybersecurity experts

Intrusion Detection Systems with Snort Rafeeq Ur Rehman, 2003 This guide to Open Source intrusion detection tool SNORT features step by step instructions on how to integrate SNORT with other open source products The book contains information and custom built scripts to make installation easy

Real-time Traffic Monitoring and SQL Injection Attack Detection for Edge Networks, 2019 Injection attacks top the list of Open Web Application Security Project s Top 10 Application Security Risks almost every year SQL Injection is one such attack that presents the adversaries an opportunity to access Personally Identifiable Information PII and commit identity theft putting breach victims at risk Any data that could potentially be utilized to identify a particular person could be classified as PII Passport number social security

number bank account number driver s license number and email address are all good examples of PII

Intrusion detection and prevention system is a system or software application that continuously monitors a network for possible malicious activity or policy violations The alerts and logs generated are typically reviewed by the administrator or SIEM A signature based IDS relies on predefined signatures to detect an attack The signatures used are usually released periodically by the company who owns the IDS software or by the admin herself Writing these signatures manually or waiting on the releases of new rules can take up significant time effort and knowledge In this thesis a system is developed that monitors traffic in real time performs deep packet inspection on each incoming packet and looks for possible SQLI patterns to form rules in Snort IDS database Once the system finds a possible SQLI pattern it saves the attacker s IP to a blacklist for the admin to review later If the attacker continues to pass such attack patterns the IP is blacklisted and the access to that specific user is blocked Our proposed system ScorPi increases the baseline intrusion detection performance by 4.7x with only 23% of the resources required by the baseline while performing in the order of a few milliseconds suitable for real time edge networks

Snort For Dummies Charlie Scott,Paul Wolfe,Bert Hayes,2004-06-14 Snort is the world s most widely deployed open source intrusion detection system with more than 500 000 downloads a package that can perform protocol analysis handle content searching and matching and detect a variety of attacks and probes Drawing on years of security experience and multiple Snort implementations the authors guide readers through installation configuration and management of Snort in a busy operations environment No experience with intrusion detection systems IDS required Shows network administrators how to plan an IDS implementation identify how Snort fits into a security management environment deploy Snort on Linux and Windows systems understand and create Snort detection rules generate reports with ACID and other tools and discover the nature and source of attacks in real time CD ROM includes Snort ACID and a variety of management tools

Intrusion Detection with Snort Jack Koziol,2003 The average Snort user needs to learn how to actually get their systems up and running Snort Intrusion Detection provides readers with practical guidance on how to put Snort to work Opening with a primer to intrusion detection the book takes readers through planning an installation to building the server and sensor

Snort 2.1 Intrusion Detection, Second Edition Brian Caswell,Jay Beale,2004-06-06 Called the leader in the Snort IDS book arms race by Richard Bejtlich top Amazon reviewer this brand new edition of the best selling Snort book covers all the latest features of a major upgrade to the product and includes a bonus DVD with Snort 2.1 and other utilities Written by the same lead engineers of the Snort Development team this will be the first book available on the major upgrade from Snort 2 to Snort 2.1 in this community major upgrades are noted by x and not by full number upgrades as in 2.0 to 3.0 Readers will be given invaluable insight into the code base of Snort and in depth tutorials of complex installation configuration and troubleshooting scenarios Snort has three primary uses as a straight packet sniffer a packet logger or as a full blown network intrusion detection system It can perform protocol analysis content searching matching and can be used to detect a variety of attacks

and probes Snort uses a flexible rules language to describe traffic that it should collect or pass a detection engine that utilizes a modular plug in architecture and a real time alerting capability A CD containing the latest version of Snort as well as other up to date Open Source security utilities will accompany the book Snort is a powerful Network Intrusion Detection System that can provide enterprise wide sensors to protect your computer assets from both internal and external attack Completely updated and comprehensive coverage of snort 2 1 Includes free CD with all the latest popular plug ins Provides step by step instruction for installing configuring and troubleshooting

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