

Intrusion Detection Prevention System using SNORT

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ABSTRACT

Living in the age of information, each and every action result in some form of data creation. According to statistics, over 300 thousand tweets and over 4 million Facebook posts are being generated per minute. Knowing the fact that more users and more data require more security. In the modern era, security and reliability have become the major concerns for an individual or an organization. In this paper, various terminologies, techniques and methodologies related to Intrusion Detection and Prevention System (IDPS) have been discussed. This paper provides different approaches on implementation of IDPS that is based on in-depth study of various research endeavors. It majorly deals with the concept of Intrusion Detection System using Snort which is a popular tool for network security. It is widely accepted by corporate sectors in order to secure their organization's network. The paper gives a fair knowledge of Snort, about its purpose, the modes it associated with, its implementations and the applications. Review has been made on the basis of the studies and research done in the literature section.

Keywords

Intrusion Detection System; Intrusion Prevention System; Snort

1. INTRODUCTION

Since the digital age is taken over, our lives have been encoded into digital clouds and stored on hard drives. Protecting this data has become the number one priority in ensuring privacy and security. IDPS is just another tool that when used properly will ensure that attacks are mitigated quickly. In fact, a network with a firewall and no IDPS is just as high security prison with no guards on Patrol. The major significance of IDPS are because of these two reasons, i.e. data protection & data privacy.

2. IDS/IPS

In general term, an intrusion can be said as an unauthorized access to someone's property or area, but when it comes to computer science, it is an act to compromise the basic computer network security goals viz. confidentiality, integrity, and privacy. Intrusion Detection is the process of monitoring the events occurring in a computer system or network and analyzing them for signs of possible incidents of threats and violations of computer security practices, acceptable use policies or standard security policies.

Intrusion Detection System (IDS) detects the presence of intrusion in the network. It is designed to monitor the events occurring in a computer system or network and responds to events with signs of possible incidents of violations of security policies. On the other hand, Intrusion Prevention System (IPS), is the network security system or technology that is capable of not only detecting the intrusion activities but also take required counter measures to prevent them.

3. TYPES OF TECHNOLOGIES

There are many types of IDPS technologies. For the purposes of this document, they are divided into the following four

groups based on the type of events that they monitor and the ways in which they are deployed.

3.1 Network based IDPS

A network-based intrusion detection system monitors and examines the network traffic for any suspicious activity or threats in the network. It reads the packets flowing in the network and searches for any malicious activity by identifying suspicious pattern in the packets. If any threat is discovered, then based upon the threat the system will take actions such as notifying administrators about it.

3.2 Wireless based IDPS

Wireless based Intrusion Detection Prevention System analyzes the traffic of wireless network by analyzing wireless protocol activities and take appropriate actions. It detects unauthorized wireless local area network in use. It cannot identify suspicious activity in the application layer, transport layer and protocol activities. It is deployed in a particular range where the organization can monitor the wireless network.

3.3 Network Behavior Analysis

NBA examines network traffic to identify threats which generate unusual traffic flows such as DDoS (Distributed Denial of Service) attack, malware (e.g. worms, backdoors), and policy violations. These systems are deployed for monitoring the flow on an organization's internal network, sometimes it is used to monitor organization's networks and external network.

3.4 Host based IDPS

HIDPS monitors characteristics of a single host and identifies intrusions within that host by monitoring host's file system, file access, system calls or network events. It can prevent system level attacks and can detect attacks which NIDPS cannot. The hosts load can be distributed over the network. It can even analyze activities that are transferred in end-to-end encrypted communications.

4. METHODOLOGIES OF IDPS

To detect and prevent any intrusion, there are a lot of methodologies which IDPS uses. These methodologies are used as per the requirement of the system.

4.1 Anomaly based Methodology

These types of attack are used for detecting the unknown attacks i.e. it detects behavior that is not known before. No rules are needed to be written for this methodology. It detects malicious traffic based on normal network traffic pattern. The disadvantage of such method is that it generates high false alarm rate.

4.2 Signature based Methodology

This methodology is used to detect unknown attacks which are already predefined in the form of signature and are saved. When a data is sent to the network, it first goes to the server where the server scans it for malicious content. It compares the network packet from the database of signature which is

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Science of Cyber Security Jun Zhao, Weizhi Meng, 2025-03-03 This book constitutes the refereed proceedings of the 6th International Conference on Science of Cyber Security SciSec 2024 held in Copenhagen Denmark during August 14 16 2024 The 25 full papers presented here were carefully selected and reviewed from 79 submissions These papers focus on the recent research trends and challenges in the emerging field of Cyber Security

Open Source Software for Digital Forensics Ewa Huebner, Stefano Zanero, 2010-01-27 Open Source Software for Digital Forensics is the first book dedicated to the use of FLOSS Free Libre Open Source Software in computer forensics It presents the motivations for using FLOSS applications as tools for collection preservation and analysis of digital evidence in computer and network forensics It also covers extensively several forensic FLOSS tools their origins and evolution Open Source Software for Digital Forensics is based on the OSSCoNF workshop which was held in Milan Italy September 2008 at the World Computing Congress co located with OSS 2008 This edited volume is a collection of contributions from researchers and practitioners world wide Open Source Software for Digital Forensics is designed for advanced level students and researchers in computer science as a secondary text and reference book Computer programmers software developers and digital forensics professionals will also find this book to be a valuable asset

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encryption and AI methods in ransomware mitigation and detection It assists the reader in exploring new research areas wherein AI can be applied to offer solutions through the contribution from researchers and academia *Emerging Artificial Intelligence Applications in Computer Engineering* Ilias G. Maglogiannis, 2007 Provides insights on how computer engineers can implement artificial intelligence AI in real world applications This book presents practical applications of AI Research in Attacks, Intrusions, and Defenses Herbert Bos, Fabian Monrose, Gregory Blanc, 2015-10-26 This book constitutes the refereed proceedings of the 18th International Symposium on Research in Attacks Intrusions and Defenses RAID 2015 held in Kyoto Japan in November 2015 The 28 full papers were carefully reviewed and selected from 119 submissions This symposium brings together leading researchers and practitioners from academia government and industry to discuss novel security problems solutions and technologies related to intrusion detection attacks and defenses Research in Attacks, Intrusions and Defenses Davide Balzarotti, Salvatore J. Stolfo, Marco Cova, 2012-09-26 This book constitutes the proceedings of the 15th International Symposium on Research in Attacks Intrusions and Defenses former Recent Advances in Intrusion Detection RAID 2012 held in Amsterdam The Netherlands in September 2012 The 18 full and 12 poster papers presented were carefully reviewed and selected from 84 submissions The papers address all current topics in virtualization attacks and defenses host and network security fraud detection and underground economy web security intrusion detection **Trusted Computing and Information Security** Huanguo Zhang, Bo Zhao, Fei Yan, 2019-01-08 This book constitutes the refereed proceedings of the Chinese Conference on Trusted Computing and Information Security CTCIS 2018 held in Wuhan China in October 2018 The 24 revised full papers presented were carefully reviewed and selected from 73 submissions The papers are centered around cryptography systems security trusted computing information security and network security Model Driven Engineering Languages and Systems Gregor Engels, Bill Opdyke, Douglas C. Schmidt, Frank Weil, 2007-09-12 This book constitutes the refereed proceedings of the 10th International Conference on Model Driven Engineering Languages and Systems formerly the UML series of conferences MODELS 2007 held in Nashville USA September 30 October 5 2007 The 45 revised full papers were carefully reviewed and selected from 158 initial submissions The papers are organized in topical sections Second International Conference on Computer Networks and Communication Technologies S. Smys, Tomonobu Senjyu, Pavel Lafata, 2020-01-21 This book presents new communication and networking technologies an area that has gained significant research attention from both academia and industry in recent years It also discusses the development of more intelligent and efficient communication technologies which are an essential part of current day to day life and reports on recent innovations in technologies architectures and standards relating to these technologies The book includes research that spans a wide range of communication and networking technologies including wireless sensor networks big data Internet of Things optical and telecommunication networks artificial intelligence cryptography next generation networks cloud computing and natural language processing Moreover it focuses on novel solutions in the context of communication and

networking challenges such as optimization algorithms network interoperability scalable network clustering multicasting and fault tolerant techniques network authentication mechanisms and predictive analytics Agents and Data Mining Interaction Longbing Cao, Ana L.C. Bazzan, Andreas L. Symeonidis, Vladimir Gorodetsky, Gerhard Weiss, Philip S. Yu, 2011-12-18 This book constitutes the thoroughly refereed post workshop proceedings of the 7th International Workshop on Agents and Data Mining Interaction ADMI 2011 held in Taipei Taiwan in May 2011 in conjunction with AAMAS 2011 the 10th International Joint Conference on Autonomous Agents and Multiagent Systems The 11 revised full papers presented were carefully reviewed and selected from 24 submissions The papers are organized in topical sections on agents for data mining data mining for agents and agent mining applications *International Conference on Information Technology and Communication Systems* Gherabi Noreddine, Janusz Kacprzyk, 2017-12-01 This book reports on advanced methods and theories in two related fields of research Information Technology and Communication Systems It provides professors scientists PhD students and engineers with a readily available guide to various approaches in Engineering Science The book is divided into two major sections the first of which covers Information Technology topics including E Learning E Government egov Data Mining Text Mining Ontologies Semantic Similarity Databases Multimedia Information Processing and Applications The second section addresses Communication Systems topics including Systems Wireless and Network Computing Software Security and Monitoring Modern Antennas and Smart Grids The book gathers contributions presented at the International Conference on Information Technology and Communication Systems ITCS 2017 held at the National School of Applied Sciences of Khouribga Hassan 1st University Morocco on March 28 29 2017 This event was organized with the objective of bringing together researchers developers and practitioners from academia and industry working in all areas of Information Technology and Communication Systems It not only highlights new methods but also promotes collaborations between different communities working on related topics Designing a HIPAA-Compliant Security Operations Center Eric C. Thompson, 2020-02-25 Develop a comprehensive plan for building a HIPAA compliant security operations center designed to detect and respond to an increasing number of healthcare data breaches and events Using risk analysis assessment and management data combined with knowledge of cybersecurity program maturity this book gives you the tools you need to operationalize threat intelligence vulnerability management security monitoring and incident response processes to effectively meet the challenges presented by healthcare s current threats Healthcare entities are bombarded with data Threat intelligence feeds news updates and messages come rapidly and in many forms such as email podcasts and more New vulnerabilities are found every day in applications operating systems and databases while older vulnerabilities remain exploitable Add in the number of dashboards alerts and data points each information security tool provides and security teams find themselves swimming in oceans of data and unsure where to focus their energy There is an urgent need to have a cohesive plan in place to cut through the noise and face these threats Cybersecurity operations do not require expensive

tools or large capital investments There are ways to capture the necessary data Teams protecting data and supporting HIPAA compliance can do this All that s required is a plan which author Eric Thompson provides in this book What You Will Learn Know what threat intelligence is and how you can make it useful Understand how effective vulnerability management extends beyond the risk scores provided by vendors Develop continuous monitoring on a budget Ensure that incident response is appropriate Help healthcare organizations comply with HIPAA Who This Book Is For Cybersecurity privacy and compliance professionals working for organizations responsible for creating maintaining storing and protecting patient information

Security in Cyber-Physical Systems Ali Ismail Awad,Steven Furnell,Marcin Paprzycki,Sudhir Kumar Sharma,2021-03-05 This book is a relevant reference for any readers interested in the security aspects of Cyber Physical Systems and particularly useful for those looking to keep informed on the latest advances in this dynamic area Cyber Physical Systems CPSs are characterized by the intrinsic combination of software and physical components Inherent elements often include wired or wireless data communication sensor devices real time operation and automated control of physical elements Typical examples of associated application areas include industrial control systems smart grids autonomous vehicles and avionics medial monitoring and robotics The incarnation of the CPSs can therefore range from considering individual Internet of Things devices through to large scale infrastructures Presented across ten chapters authored by international researchers in the field from both academia and industry this book offers a series of high quality contributions that collectively address and analyze the state of the art in the security of Cyber Physical Systems and related technologies The chapters themselves include an effective mix of theory and applied content supporting an understanding of the underlying security issues in the CPSs domain alongside related coverage of the technological advances and solutions proposed to address them The chapters comprising the later portion of the book are specifically focused upon a series of case examples evidencing how the protection concepts can translate into practical application

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Héctor Quintián,Emilio Corchado,Alicia Troncoso Lora,Hilde Pérez García,Esteban Jove,José Luis Calvo Rolle,Francisco Javier Martínez de Pisón,Pablo García Bringas,Francisco Martínez Álvarez,Álvaro Herrero Cosío,Paolo Fosci,2024-11-15 This volume of Lecture Notes in Networks and Systems contains accepted papers presented at the 17th International Conference on Computational Intelligence in Security for Information Systems CISIS 2024 and the 15th International Conference on EUropean Transnational Education ICEUTE 2024 which were held in the beautiful city of Salamanca Spain in October 2024 The aim of the CISIS 2024 conference is to offer a meeting opportunity for academic and industry related researchers belonging to the various vast communities of Computational Intelligence Information Security and Data Mining The need for intelligent flexible behavior by large complex systems especially in mission critical domains is intended to be the catalyst and the aggregation stimulus for the overall event After peer review the CISIS 2024 International Program Committee selected 24 papers for publication in these conference proceedings In this edition one special session was organized Artificial

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Information Security Practice and Experience Swee-Huay Heng, Javier Lopez, 2019-11-19 This book constitutes the refereed proceedings of the 15th International Conference on Information Security Practice and Experience ISPEC 2019 held in Kuala Lumpur Malaysia in November 2019 The 21 full and 7 short papers presented in this volume were carefully reviewed and selected from 68 submissions They were organized into the following topical sections Cryptography I System and Network Security Security Protocol and Tool Access Control and Authentication Cryptography II Data and User Privacy Short Paper I and Short Paper II **pfSense 2.x Cookbook** David Zientara, 2018-12-17 A practical example driven guide to configuring even the most advanced features of pfSense 2 x Key Features Build a high availability fault tolerant security system with pfSense 2 x Leverage the latest version of pfSense to secure your cloud environment A recipe based guide that will help you enhance your on premise and cloud security principles Book Description pfSense is an open source distribution

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Configure the essential pfSense services namely DHCP DNS and DDNS Create aliases firewall rules NAT port forward rules and rule schedules Create multiple WAN interfaces in load balanced or failover configurations Configure firewall redundancy with a CARP firewall failover Configure backup restoration and automatic configuration file backup Configure some services and perform diagnostics with command line utilities

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