Bro: An Open Source Network Intrusion Detection System

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Abstract: Bro is a powerful, but largely unknown open source network intrusion detection system. Based on a sound design, Bro achieves its main goals – separating policy from mechanisms, efficient operation in high-volume networks, and withstanding attacks against itself – by using an event-driven approach. Bro contains several analyzers (e.g. protocol decoders for a variety of network protocols and a signature matching engine), which are by themselves policy-neutral but raise events as an abstraction of the underlying network activity. Based on scripts written in Bro's own powerful scripting language, the user defines event handlers to specify his environment-specific policy.

We give an overview about the design and implementation of Bro, describe our experiences with deploying it in a large-scale research environment, and present some of our extensions.

1 Introduction

Due to the enormous increase in the number of attacks seen on the Internet, *network intrusion detection systems* (NIDSs) are an important part of many security policies. In contrast to a *host-based* intrusion detection system, a NIDS usually taps the network at some central point, monitoring all traffic to detect malicious activity. Traditionally, two approaches to network intrusion detection are differentiated: a system using *anomaly-detection* relies on a definition of *normal* network activity and alerts if traffic deviates from this profile. Deviation is typically measured using statistics. On the other hand, *misuse-detection* systems use a library of specific attack characteristics and generate an alert whenever they locate one of them in the monitored traffic. The draw-back of misuse-detection is the difficulty of recognizing previously unknown attacks. While anomaly-based NIDSs have the potential for this, they often suffer from a high number of false–alarms. The most common form of misuse detection is signature matching: the NIDS identifies an attack by recognizing a specific byte sequence within the network packets. Most commercial systems follow this approach [Jac99] as does the well-known open source software Snort [Roe99].

Taking a closer look at open source NIDSs, we notice that Snort is the only one widely deployed in real networks. It appears that most people are not aware of alternatives. This is interesting for three reasons. First, in other areas of security there usually is a variety of open source software available. Second, Snort shows some technical limitations that

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Sabu M. Thampi,Gregorio Martinez Perez,Ryan Ko,Danda B. Rawat

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resource for researchers industry professionals and students Covering both established concepts and the latest advancements it addresses the pressing need for robust security frameworks in today s interconnected digital ecosystems The first section of the book lays a strong groundwork for understanding IoT security exploring areas such as attack modelling intrusion detection fraud prevention and secure communication protocols It also discusses advanced defenses for 5G powered IoT networks and the integration of Software Defined Networking SDN The second section focuses on IoD examining critical topics like authentication trust management access control and ethical considerations in drone based surveillance By combining theoretical perspectives with practical applications this book provides a holistic approach to securing the connected world **A GUI Framework for Detecting Intrusions Using Bro IDS** Shaffali Gupta,Sanmeet Kaur,2013 Network security is the provision made in an underlying computer network or rules made by the administrator to protect the network and its resources from unauthorized access To make network secure an Intrusion detection system is one of the efficient system Bro is an open source Network Intrusion Detection System that monitors network traffic check for suspicious activities and notifies the system or network administrator Some Policy Scripts are already built in Bro IDS In this work various types of live traffic is captured and analyzed Some new policy scripts are built to filter out the needed packets from the captured traffic Also a Graphical User Interface is designed to eliminate the need of writing of commands at terminal and making it easy for users to create the scripts and run them on captured traffic A GUI framework is integrated in Bro that analyzes and filters the traced network traffic **Network Intrusion Detection and Prevention** Ali A. Ghorbani,Wei Lu,Mahbod Tavallaee,2009-10-10 Network Intrusion Detection and Prevention Concepts and Techniques provides detailed and concise information on different types of attacks theoretical foundation of attack detection approaches implementation data collection evaluation and intrusion response Additionally it provides an overview of some of the commercially publicly available intrusion detection and response systems On the topic of intrusion detection system it is impossible to include everything there is to say on all subjects However we have tried to cover the most important and common ones Network Intrusion Detection and Prevention Concepts and Techniques is designed for researchers and practitioners in industry This book is suitable for advanced level students in computer science as a reference book as well **Security in Computing and Communications** Sabu M. Thampi,Gregorio Martinez Perez,Ryan Ko,Danda B. Rawat,2020-04-25 This book constitutes the refereed proceedings of the 7th International Symposium on Security in Computing and Communications SSCC 2019 held in Trivandrum India in December 2019 The 22 revised full papers and 7 revised short papers presented were carefully reviewed and selected from 61 submissions The papers cover wide research fields including cryptography database and storage security human and societal aspects of security and privacy Campus Technology ,2008 **Characterizing and Improving Distributed Network-based Intrusion Detection Systems (NIDS)** Elliot Parker Proebstel,2008 Alert Reduction for Network Intrusion Detection Jingmin Zhou,2008 **ACM**

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