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Original Article

Security Information and Event Management (SIEM) Tool

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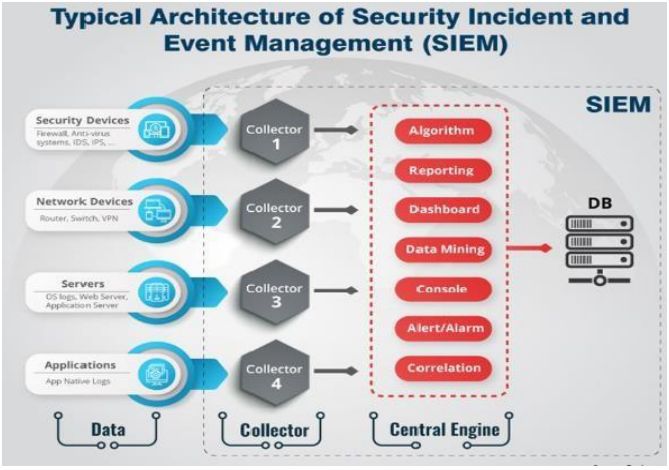
Abstract: *Strong and flexible cybersecurity solutions are essential in a time when cyber threats are always growing. The implementation and effectiveness of the SIEM platform – an open-source architecture for threat prevention, detection, and response – are thoroughly examined in this research. The diverse features of SIEM, such as intrusion detection, log data analysis, file integrity monitoring, vulnerability detection, configuration evaluation, incident response, regulatory compliance, cloud security, and container security, are incorporated into the suggested system architecture. Organizations may create a centralized and scalable cybersecurity strategy by combining SIEM agents with the Elastic Stack and deploying them across a variety of IT environments. Tailored threat detection and proactive incident response are made possible by customizing and optimizing SIEM rule sets. The system's resistance to new attacks is further increased via automated response systems. Constant optimization and monitoring guarantee the cybersecurity framework's dependability and effectiveness. This study offers practical insights into the implementation and efficacy of the suggested system design in reducing cyber threats and protecting organizational assets through empirical analysis and testing.*

Keywords: *Cybersecurity, Cyber threats, Incident Response, SIEM, SOC.*

INTRODUCTION

Security analysts depend on a SIEM's assistance to correlate logs and consistently spot any abnormal activity inside their system, enabling them to swiftly respond to threats or attacks. Security Event Management (SEM), which provides real-time monitoring and alerts, and Security Information Management (SIM), which collects log data and events, are combined to form a SIEM. [2] Security Information and Event Management (SIEM) systems have become an essential part of any Security Operations Center (SOC); however, classic SIEMs, which were mainly intended to be log collectors and central alert repositories that do not react to events, are being replaced. [3] Businesses developed "advanced SIEM systems that have evolved to include user and entity behavior analytics (UEBA) and security orchestration, automation, and response (SOAR)" in response to the rising number of cyberattacks." [4]



Given the complexity of most networks, security analysts would require an enormous amount of time without the aid of a SIEM to consistently spot suspicious behaviors by comparing logs between various types of devices. It is uncommon for them to recognize threats to their infrastructures and take timely action to stop any damage from occurring. Additionally, the information gathered can be used in various ways thanks to the SIEM solution. For instance, when a user's account gets locked out, the help desk staff can create a report labeled "failed authentication." The help desk would have needed to ask a system administrator to manually go through logs in order to look for failed login events if there hadn't been a SIEM. Technical issues may be resolved,

capacity can be monitored, and security can be strengthened with this kind of query-based report generation.

OBJECTIVE

This study's main goal is to thoroughly analyze the SIEM platform's suitability and effectiveness in tackling today's cybersecurity issues. This include assessing its efficacy in relation to regulatory compliance, cloud security, containers security, intrusion detection, configuration evaluation, file integrity monitoring, vulnerability detection, and incident response. By means of a methodical analysis of these fundamental features, our objective is to offer discernments regarding the possible advantages and constraints of using SIEM in actual cybersecurity situations.

METHODOLOGY

We use a multifaceted approach that combines theoretical research with real-world experimentation to accomplish our goals. This entails a careful analysis of the body of research on cybersecurity frameworks and techniques in addition to practical experience using the SIEM platform in virtual settings. Through the integration of theoretical understanding and empirical observations, our goal is to present a thorough evaluation of SIEM's efficacy in countering cyber threats and strengthening cybersecurity posture in general.

PROPOSED SYSTEM

The SIEM platform serves as the cornerstone of the proposed system design, which takes advantage of its extensive feature set for threat prevention, detection, and response. The system consists of multiple essential parts and configurations that work together to provide a strong cybersecurity framework that is specifically designed to meet the needs of contemporary businesses. Agents are used to monitor a variety of systems, such as cloud-based workloads, virtualized environments, on-premises servers, and containerized platforms. To guarantee thorough coverage and visibility into the complete IT infrastructure, including endpoints, servers, and network devices, agents are carefully placed. The program gathers security data, which is then collected, aggregated, and analyzed by a centralized management server. The management server is set up to effectively handle high numbers of security events and offers real-time alerting and monitoring. Policies for data storage and retention are put in place to make sure that legal obligations are met and to make forensic analysis easier. To improve data visualization and analysis capabilities, the SIEM platform is seamlessly linked with the Elastic Stack, which includes Elasticsearch, Logstash, and Kibana. In order to provide quick and effective search queries, Elasticsearch acts as the backend data store for indexing and storing security events. For data ingestion, parsing, and enrichment, Logstash is employed, guaranteeing interoperability with a range of data sources and formats. With Kibana's intuitive dashboard, reporting, and data visualization interface, security analysts can easily extract actionable insights from the security data they've gathered.

CONCLUSION

The appropriate answer to meet the demands of El Dorado County was not readily apparent. Every solution has advantages and disadvantages based on the investigation, evaluation, and testing of the various options. To compile the final report card, I integrated the Gartner use case score, critical capability ratings, and the scores based on each solution's functionality, simplicity of use, and compatibility as part of my evaluation matrix.

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