



Literature Review of Data Security Measures and Access Control Mechanisms of Information Security

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Abstract: Data security is one of the major concerns in IT industry, especially since everything is getting digitized. With the rising amount of data, there is also a rise in methods and techniques to secure the data generated. This text reports a study that was conducted to understand and research about the various data security techniques implemented and devised in the past 20 years. This text also covers various research works that shed some light on data masking, data encryption and role-based access control.

Index Terms – database security, information security, data masking, access control list.

I. INTRODUCTION

In today's world, tremendous amounts of data is generated and the necessity of managing it is increasing every day. Various methods and techniques of managing data have been devised and implemented, and research is done to find better and more advanced ones. Securing the data is one of the key goals of managing data effectively. Securing can be in the form of hiding some part of data, masking or changing some of the data or even making it non-existent to unauthorized entities altogether. This study has been done to understand and learn about the various past attempts at securing data in the domains of data masking, access control, identity management and data encryption. In the following text, a brief introduction to those concepts will be discussed, followed by understanding the criteria and analysis the authors have done while reviewing the research work.

Data security is the practice of protecting information from unauthorized access and manipulation of data. It can be achieved through various physical (using hardware) and virtual (using software) methods. Data masking is one of the virtual techniques for protecting data. The process of changing or hiding the actual data and replacing it with some other content to protect the data from unauthorized and unwanted consumption is known as data masking. Limiting and restricting access to specific data to only those entities which are authorized to access it is known as Access Control. Implementing access control based on roles played by the entities in the system is known as Role Based Access Control. Data encryption, in simple words, is converting data from readable form to unreadable form. Encryption is used by most organizations to protect their data and their customers' data.

The authors of the text have followed a systematic approach during the process of this literature review. The most relevant papers and research work was selected to be studied and were tested on the following criteria: significance of the work, contributions made in the domain, drawbacks and shortcomings of the research work in context. Those research works which fit the above criteria are discussed in the following text. This text aims to be a point of reference for future research works where a review on the works done in past 25 years can be found.

II. LITERATURE REVIEW

This section will discuss 4 of the most significant research works the authors have studied along with a study of various technology available to secure data. A summary of the paper followed by the review; this will be the structure of the discussion for this text.

1. Application of database masking techniques for data security: This paper was used to study importance of data masking for data security, what are the different data masking techniques. Paper also discuss what are the challenges that will appear during developing this kind of application. It also gives the idea how to design and implement the data masking application. By studying research paper concluding that, by implementing this masking technique it will solves the more critical threats likes data loss, exfiltration, insider threats, insecure interfaces with third party systems. It also reduces the data risks associated with cloud adoption. Using this technique, it also make data useless to unauthorized user or attackers, while maintaining many of its inherent functional properties. It also reduces risks associated with sharing the data with integrated third-party applications and cloud migrations. It also avoids risks associated with outsourcing any project. Because most of the organizations are merely rely on trust when dealing with outsourced persons, masking prevents data from being misused or stolen.

2. Database Security using Encryption: This paper disuses the importance of database encryption and also discusses the various encryption techniques. It also tell that what is the need of encrypting the data and possible ways for data encryption. It explains the type of encryption, which are the technique we can used, encryption impacts all aspects of a business, including design, development, and operations. While the study of encryption is about trying to explain encryption logic systematically through generalizations and propositions, encryption technology is, based on encryption theories, a product of necessity aimed at creating the most cost-efficient, profitable outcomes in line with economic principles. It is the outcome of a process of transforming, refining, and amalgamating theories for practical application.

3. E- banking: A review of database security issues: This paper was used to study of issues in electronic banking system and what are the solution over it, what are the threats and attacks associated with database security and privacy of banking data. It also gives the information about which are the technologies can be used to prevent the attack and how to improve e-banking business. author also focuses benefits of e-banking and how to improve it. This will increase the security for online banking system.

4. Research on the Development and Trend of Data Masking Technology: This paper was used to study the concepts of Anonymization and De-Identification. The authors of the text firmly believe that anonymization and de-identification are becoming the basic requirements of data protection. The text discusses the various implementation techniques of data masking that enable it to be a way to achieve anonymization without touching the integrity and completeness of the data. The paper also mentions that incorrect use of data masking can lead to over protection of unnecessary data, which in turn can cost the organization computational time and exponential payloads to process if the data is significantly large and/or frequent masking/unmasking operations are done on the data.

5. Survey of existing technologies: Along with studying research papers and books, the team also did a technical survey to understand which different technologies are available in the market (for regular user as well as corporate businesses). This also provided a way of understanding how those technologies are built. Considering the project requirement is to develop a similarly functioning security layer, this step happened to be crucial in planning the development process of the project.

III. CONCLUSION

After studying and reviewing the above research works, it is safe to conclude that there is a dire need for devising and developing smarter and more robust data security solutions for protecting the critical information. Along with solutions, it is also necessary to develop stronger encryption algorithms because what the industry currently assumes pinnacle of safety will soon be legacy technique. Thus, concepts like Dynamic Data Masking, Access Control and Identity Management have to be coupled into one single solution. Only then it is possible to architect more robust software solutions for secure data management.

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