



Chapter XVIII

Propagation and Delegation of Rights in Access Controls and Risk Assessment Techniques

Saravanan Muthaiyah, George Mason University, USA
and Multimedia University, Malaysia

Abstract

Access control methods have been improvised over time, but one area that remains quite grey is the concept of assessing risk levels before any type of access rights are granted. This is relatively a new paradigm in the research of semantic Web security, and new methodologies for this effort are being studied. In this chapter, we will see how qualitative risk assessment (Nissanke & Khayat, 2004) and quantitative risk assessment are carried out. The purpose is to have different methods of assessment for better grant of access control rights and permissions. New examples based on the model described (Nissanke & Khayat, 2004) are used to illustrate the concept. A new quantities technique is also added to complement the qualitative techniques.

Introduction

This chapter introduces the concept of access control and its objectives in fulfilling security requirements for the computing world. The main arrears in access control, namely **DAC**, **MAC**, and **RBAC**, will be covered, thus giving enough background knowledge to the reader on existing policies and framework. Hence, the reader will be able to comprehend the concept of task delegation with regard to access control policies and how delegated tasks or roles can affect existing risk levels in an organization. **Measuring risk** has a two fold benefit: one is that it enables security officials to be prepared with more accurate security measures with higher granularity, and secondly, this will certainly be useful for security plans for mitigating potential risks.

However, measuring risk is easier said than done. Being subjective in its nature, we are unable to say which technique is the best. In finance-related research, models have been introduced, such as VAR (value at risk), to accurately measure risk based on volatility of share prices in the market. There is a gap of knowledge in computer science in this area and as such, this chapter introduces two novel ways of measuring risk. The assumption is that we take the real world approach in understanding risk or, in other words, there are risks that we can measure and there are risks that cannot be measured. For the former, a two-dimension approach will be used, which will be referred to as **quantitative approach (QTA)**, and for the latter, risk graphs coupled with task delegation (role assignment) framework will be used, which will be referred to as **qualitative approach (QLA)**.

Background

What is Access Control?

Security policies or technologies devised to prevent unauthorized usage or access can be regarded as access control. Access controls can be physical, technical, or administrative, and can be categorized as preventive or detective. Access control is a preventive control that attempts to avoid unwanted events from taking place whereas detective controls attempt to find out about events after they have taken place. Audit trails, intrusion detection methods, and checksums are examples of detective control techniques.

Access Control Objectives?

Nowadays, databases contain extensive information that is sensitive and proven to be highly valuable. If the data is accessed by unauthorized users, it can be detrimental to the organization that is the gatekeeper of that data. Organizations today are faced with challenges such as maintaining privacy and guaranteeing trust to its patrons. Technolo-

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