Abstract

This chapter reviews the main types of access control mechanisms that can be used to govern subscription-based financial services. The overall performance of these mechanisms is analyzed with respect to several important features of subscription-based financial services. Namely, the chapter analyzes the impact of the following features: (1) the number of clients/subscriptions can be potentially large; (2) the number and types of subscriptions offered by a provider varies in time; (3) subscription terms may change; and (4) subscriptions terms may take into account mutable information. Furthermore, the chapter presents in detail one mechanism that achieves good performance.
Introduction

Increasingly, enterprises are offering online financial services. Often, access to such financial services is based on mutually agreed upon subscriptions. Subscriptions commonly embed control provisions—such as who and in what conditions is allowed to access a service. Information assurance occurs then as an ancillary to subscriptions; the control terms embedded in subscriptions are formalized by control policies and enforced by access control mechanisms.

To illustrate the nature of subscription terms consider the following example. Assume that a rating agency offers a service estimating the probability of default (PD) of enterprises belonging to various industries. This service is used by individual clients as well as financial organizations, such as banks and mutual and hedge funds, to estimate the risk of current and future investments. The price of a subscription to this service depends on several factors, including the number of times that the service is going to be used and the number of companies/industries whose PD can be queried. Assume that a financial organization, called, say, ACME, buys a subscription for the year 2006, allowing its analysts to issue 1,000 queries regarding the PD of enterprises belonging to oil and gas industries. Regulating access of ACME’s analysts to the PD service entails formalizing and enforcing the following subscription terms:

1. Agents certified as analysts by ACME are authorized to use this service
2. At most 1,000 queries should be served in the time interval, Jan. 1 to Dec. 31, 2006
3. ACME analysts are authorized to query only the PD of enterprises belonging to oil and gas industries

The PD scenario is used next to illustrate the issues that an access control mechanism regulating access to financial services needs to take into account. First, such applications may have a potentially large number of clients, and the mechanism may need to enforce a large set of disparate control policies. Clients may buy different subscriptions, and, therefore, disparate control policies are needed to formalize the control terms embedded in various subscriptions. For example, in the PD scenario, subscriptions and, thus, the underlying access control policies, may differ in the number of queries that should be served, the industries to which queries refer to, the time frame in which the subscription is valid, and so forth.

Second, an access control mechanism for financial services needs to take into consideration that the enforced set of policies is mutable. New subscriptions for financial services can be bought at any time, and existent subscriptions can end or can be cancelled. Consequently, the policy set changes in time; the beginning of a new subscription triggers an addition to the policy set, and the ending of a subscription triggers a deletion from the policy set. Additionally, the policy set changes whenever a client negotiates a revision of its subscription for a financial service. For example, in the PD scenario, ACME may negotiate to increase the number of industries to which its analysts have access to or the number of queries its analysts are authorized to ask.
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