Chapter 7.5
Countermeasures for Protecting Legally Sensitive Web-Powered Databases and Web Portals

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INTRODUCTION

The issue of the escalation of security breaches in the field of Web systems has caused a great deal of disquiet in the computer security community. The majority of recorded security violations against legally sensitive portals have raised numerous issues both at an individual and at an organizational level. Furthermore, taking for granted the fact that security achieved through the isolation of the targeted systems is a path which no one is willing to follow, it is understood that security countermeasures must be perceived and applied without any alterations in respect of the current operational scheme. The economic and social reasons for using the Internet are still far too compelling (Schneier, 2005). Looking in this direction, the complexity as well as the urgency of the present situation has attracted specialists from other scientific sectors, such as psychology and law, who contribute to the search for an integrated multilevel solution required in this context.

BACKGROUND

The issue of making computers that host legally sensitive information secure has been a major concern of the computer security community over the years (Computerworld.com, 2003). A group of experts argue that security features should not be built into the Web portal's or into the Web database's infrastructure, but rather added on to it, according to emerging needs, because doing so would increase dramatically the system's complexity, rendering it cumbersome to debug, to maintain, and to further develop. Another view is held that claims a mixed solution must be ad-

opted. As routine tasks like access control must be handled in the database and because new threats emerge daily, add-on security solutions should be applied when it is considered necessary.

MAIN THRUST

It is obvious that in view of blocking any possible attack (see other sections, for example, on the "Security Threats in Web-Powered Databases and Web Portals," which also appears in this publication), a corresponding multilevel countermeasure policy must be followed. Below, the most common security countermeasures for these types of attacks are reviewed.

Network-Level Countermeasures

Looking forward to preventing all possible attacks performed on the network layer of a legally sensitive Web portal, security mechanisms must be implemented (Microsoft Corporation, 2003). Primary solutions for these type of attacks are cryptographic protocols, such as SSL or TLS, that undertake the task of encrypting communication data from the client to the server, and vice versa. The usage of these protocols guarantees that the data are revealed only to authorized parties, thus ensuring information confidentiality. Furthermore, by adopting Ipsec, which is an obligatory part of Ipv6 (Wikipedia, 2006), additional security mechanisms that ensure authentication, data confidentiality, and message integrity between communicating parties are interpolated in the security scheme. As a result, sniffing attacks, while successful in capturing the data, fail in reaching their goal, as the captured data are in a encrypted form that cannot be used alone to produce their decrypted version. As for tampering, message authentication codes included in Ipsec can be used to discover if the received message is really the original one sent the legitimate sender (Tipton & Krause, 2004). In addition, the message authentication code included in the above cryptographic protocols by using parameters that are related with current time, assures that no prior connection can be used to forge a new one, thus preventing any session high-jacking attempt. Finally, to successfully counter the spoofing threat, access control mechanisms are needed such as firewalls, both network and application ones, that have appropriately been configured. The first category, known as packet filtering routers, is responsible

Figure 1. A firewall protected Local Area Network containing the Web portal assets