Chapter VI

A Comprehensive XML Based Approach to Trust Negotiations

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Abstract

Trust negotiation is a promising approach for establishing trust in open systems like the Internet, where sensitive interactions may often occur between entities at first contact, with no prior knowledge of each other. In this chapter we present Trust-\(X\), a comprehensive XML-based XML framework for trust negotiations, specifically conceived for a peer-to-peer environment. We also discuss the applicability of trust negotiation principles to mobile commerce. We introduce a variety of possible approaches to extend and improve Trust-\(X\) in order to fully support mobile commerce transactions and payments. In the chapter, besides presenting the Trust-\(X\) system, we present the basic principles of trust negotiation.

Introduction

Computer systems have traditionally had centrally managed security domains. Every entity that can access such systems has one or more identities in that domain. The underlying assumption is that entities in the system already know each other. Therefore, the system relies on party identities to grant or deny authorizations.

As we move towards a globally Internetworked infrastructure, like the Internet, interactions involving strangers are dramatically increasing. In particular, transactions between companies and their cooperating partners or customers are becoming of everyday use. Furthermore, advances in technology enable users to perform commerce transactions through the use of mobile systems, adding new requirements to the traditional scenario. Nowadays, companies of all sizes are able to conduct business without worrying about the territorial market limitations of the past. In such a complex scenario, traditional assumptions for establishing and enforcing access control regulations no longer hold. The entities need not only to authenticate each other, but also to trust each other in order to exchange sensitive information and resources. Interactions are further complicated by the fact that usually the interacting entities belong to different security domains, or can change domains during a transaction if they are mobile users, and/or do not have any pre-existing relationships.

Traditional attempts to establish trust in open systems either minimize security measures or assume that parties are not strangers and can present a local identity to obtain services. According to such paradigm each subject is uniquely identified by an ID (e.g., login name, IP address) that is the means for proving the subject’s trustworthiness. However, identity-based methods for establishing trust are not feasible in an environment like the Web. In such an environment, properties other than identity are crucial in determining parties’ trustworthiness.

A promising approach in this respect is represented by trust negotiation (TN) (Seamons & Winslett, 2001), according to which trust is established through a mutual exchange of digital credentials. Disclosure of credentials, in turn, must be protected by the use of policies specifying which credentials must be received before the requested credential can be disclosed.

A trust negotiation system, thus, relies on digital credentials held by the negotiating parties, with the goal of establishing mutual trust before completing the transaction. This approach allows parties having no pre-existing relationships to confidently perform sensitive interactions.

One of the most interesting applications for trust negotiation systems is represented by e-commerce applications. An e-commerce application typically carries out commercial transactions on the Web, such as buying and selling products, or various other activities, such as supply chain management. Trust negotiation systems represent a powerful means to conduct business transactions, very often characterized by the fact that the interacting entities are unknown to each other and need to establish a sufficient level of trust to complete the transaction. Mobile commerce, in particular, is an important branch of e-commerce requiring additional trust establishment capabilities. In a nutshell, mobile commerce provides consumers with secure, faster and personalized services and is
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