Chapter III

Web Services Enabled E-Market Access Control Model

Harry Wang, University of Delaware, USA
Hsing K. Cheng, University of Florida, USA
Leon Zhao, University of Arizona, USA

Abstract

With the dramatic expansion of global e-markets, companies collaborate more and more in order to streamline their supply chains. Small companies often form coalitions to reach the critical mass required to bid on large volume or wide ranges of products. Meanwhile, they also compete with one another for market shares. Because of the complex relationships among companies, controlling the access to shared information found in e-markets is a challenging task. Currently, there is a lack of comprehensive access control approaches that can be used to maintain data security in e-markets. We propose to integrate several known access control mechanisms such as role-based access control, coalition-based access control, and
relationship driven access control into an e-market access control model (EMAC). In this chapter, we present a Web services-based architecture for EMAC and the associated concepts and algorithms. We also illustrate, via an automotive e-market example, how the EMAC model can support e-market access control.

Introduction

Aimed to make business contact and transactions easier and more cost effective, e-markets have emerged in several industries. For instance, Covisint, an e-market owned by a group of the biggest auto manufacturers, is anticipated to handle $240 billion per year, which is greater than the GDP of Sweden (Feldman, 2000). Many companies have begun the evolution from traditional business practices to e-business to strengthen customer service, streamline supply chains, and reach existing and new partners.

E-markets open up new possibilities of trade by providing various tools and services. E-catalogs and sourcing directories help both suppliers and buyers increase market visibility, shorten processing time and easily locate business partners (Baron, Shaw, & Bailey, Jr., 2000). E-auctions make prices more dynamic and responsive to economic conditions (Feldman, 2000). Scrutiny of the participating companies by e-markets increases the trust between trading partners and makes the establishment of new business relationship easier. Process collaboration tools help companies integrate their processes, which simplifies the work and avoids duplications (eMarket Services, 2002).

As e-markets develop and offer more advanced services, many serious challenges have been presented. Among those challenges, security has been highlighted as a critical issue that must be dealt with. Businesses generally perform controls over the internal use of their business processes. In the e-market environment, this controlled access must be extended to outside the company boundaries (Medjahed, Benatallah, Bouguettaya, Ng, & Elmagarmid, 2003). Depending on the business situation, participating companies may want e-markets to hide their identities, current trading positions, sensitive catalog items, history, or ongoing activities with other players (Feldman, 2000). This gives rise to the need for advanced access control mechanisms.

Although there have been many research efforts in access control in recent years (Joshi, Aref, Ghafoor, & Spafford, 2001), there is a lack of comprehensive methods that can be used directly in the context of e-market access control. We propose to integrate several existing access control models to meet the needs of data security in the presence of complex relationships among companies that participate in an e-market, which we refer to as e-market access control model (EMAC). Among
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