Chapter 16
A License Revocation Protocol Supporting Digital License Reselling in a Consumer-to-Consumer Model

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ABSTRACT

Digital Rights Management (DRM) is an important technology supporting e-commerce systems and online marketing, enabling content owners and market intermediaries to securely manage and deliver digital content. In addition, P2P (peer-to-peer) networks play a pro-motive role in e-commerce. However, it facilitates illegal access to copyrighted media which may cause a violation of content owners' rights. P2P could support legal digital content transfer—reselling digital content. One peer (a reseller) could use P2P technology to send a digital content and its license to another peer (a buyer). A reseller could continue to resell it many times, causing content owners to lose revenue. This paper presents a License Revocation Protocol (LRP) to support reselling of a digital license. This LRP protocol enables a license issuer, representing a content owner, to confirm that once a reseller has resold his license, the reseller cannot continue to use the license. With LRP protocol, a reseller does not get the license payment until he revokes his resold license. The LRP protocol does not make use of any additional trusted hardware device, thus making the protocol more cost-effective.

A LICENSE REVOCATION PROTOCOL SUPPORTING DIGITAL LICENSE RESELLING IN A CONSUMER-TO-CONSUMER MODEL

As the use of the Internet increases, e-commerce systems become more critical for the effective distribution and use of digital contents. The fast growth of digital contents means that protection and management of this content are a crucial issue for content owners. One of the most promising technologies to protect and manage digital content is the Digital Rights Management (DRM) technology. DRM is a technology that allows content owners to manage usage rights over digital contents (Delgado, Torres, Llorente, & Rodriguez, 2011). Examples of these rights include copy permit, pay-per-view, one-week rental, etc. It also enables only authorized consumers to access digital contents. The authorized consumers are the ones who buy digital licenses corresponding to this content from a License Issuer (LI). Upon getting the licenses, they can access the content according to the usage rights granted in these licenses.

P2P is another technology enabling two users to communicate and share digital resources (e.g., contents) (Ingle & Kumar, 2011; Ying, 2010). In a P2P system, users are considered as service/content providers and at the same time as users. With this feature, P2P networks play a promotive role in e-commerce (i.e., in distribution and transmission of digital multimedia contents) (Berghel, 2001). Although, P2P could facilitate pirate and illegal access to digital content, P2P technologies gradually improved distribution channels for new digital content products. In Gayer and Shy (2003), it is reported that the new distribution channels based on P2P models enhanced the sales of digital content publishers.

Current DRM systems, such as (Microsoft-Corporation, 2004; OMA, 2006; Apple, 2005; Serro et al., 2003; IBM, 2005; RealNetworks, 2008), mainly focus on the protection of content owners' rights. They have not given the same due consideration to consumers' rights. In particular, these systems do not permit consumers to resell the licenses they have purchased. Reselling something that a consumer rightfully owns (including digital licenses) is a legitimate right under the first sale doctrine (United States Copyright Office, 1984). To support digital license reselling, P2P technologies could be a useful tool. A consumer (a reseller) who wants to resell his license and its encrypted content can first use a P2P technology to send the encrypted content to another consumer (a buyer). The buyer then uses a secure way to send a payment for this license to the reseller. By this way, there is no need for content providers to deliver a digital content to a new buyer, thus keeping content providers' overhead at a minimum level and reaching to a vast number of consumers.

In Gaber and Zhang (2010), we have proposed a method called Reselling Deal (RD) method. This method allows a reseller to fairly exchange his digital license of a DRM-protected content for a payment from a buyer. The method comprises four phases: RD creation, RD signing, RD activation-request, and RD activation. In the RD creation, Alice and Bob negotiate a contract, called RD (Reselling Deal). If they are both happy with the RD terms and conditions, including agreed payment, they then sign this RD in the RD signing phase. This can be achieved by the contract signing protocol proposed in Gaber and Zhang (2011). To complete the reselling and get the license, Bob has to send LI an RD activation request consisting of signed RD, agreed payment. In the last phase (RD activation), LI activates the signed RD. In other words, LI activates Alice's resold license on Bob's device such that this license can only be accessed on Bob's device. LI also sends Alice the payment but after LI has confirmed that Alice's resold license has been indeed revoked on Alice's device, (i.e., Alice cannot use it any more). Without revoking Alice's resold license, the monetary interests of the content owner will be affected as two consumers could use the same license at the same time.

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